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THE IRON AGE

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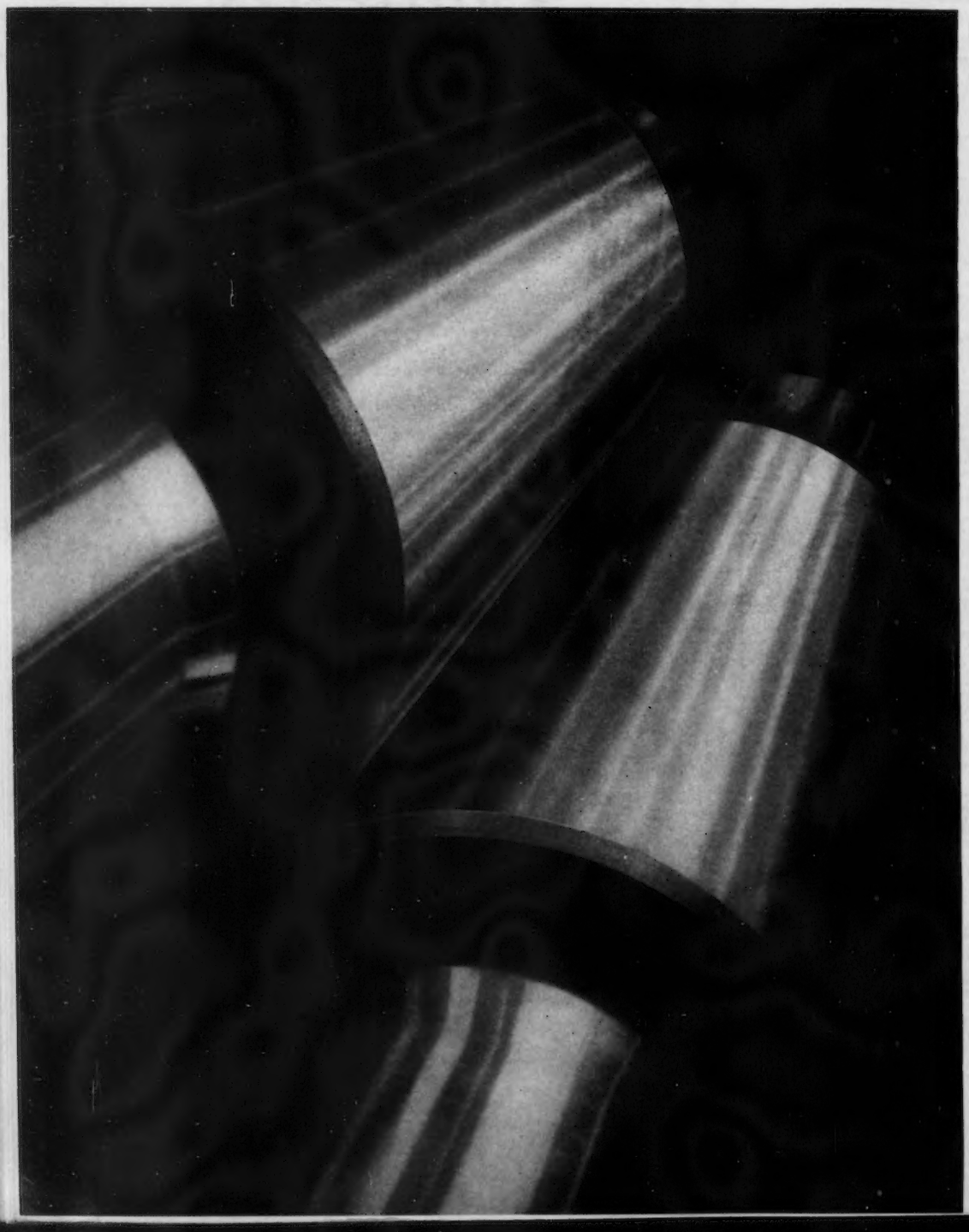

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AUGUST 24, 1939

Established 1855 Vol. 144, No. 8

Floods in the Subway, Etc.

AS this is written, the morning paper tells of a cloudburst in the County of Queens, N. Y., that halted the Independent Subway System for nine hours. A very unusual occurrence. Hundreds of passengers had to get off and crawl along catwalks to the nearest station. What a cussing these people probably gave to the subway company, to its builders, its engineers, its equipment, and its operators!

This one failure of a complex and highly mechanized system at the worst caused no more than a slight inconvenience to a limited number of people. And these same people, day after day, week after week, and month after month had enjoyed the longest, fastest and smoothest train ride in the United States at the lowest cost per mile, without ever giving thought or thanks to the technical achievements that made it possible.

Most people accept without thought or thanks the benefits that they receive daily from technical progress. But let there be the slightest interruption to cause temporary inconvenience and the benefits are quickly forgotten.

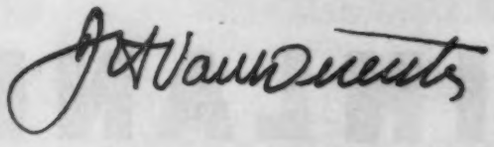
Efficient machinery is quiet and unspectacular. It does not advertise itself to the public. The "clang, clang, clang" of the Anvil Chorus is associated with hand work, not with mechanization.

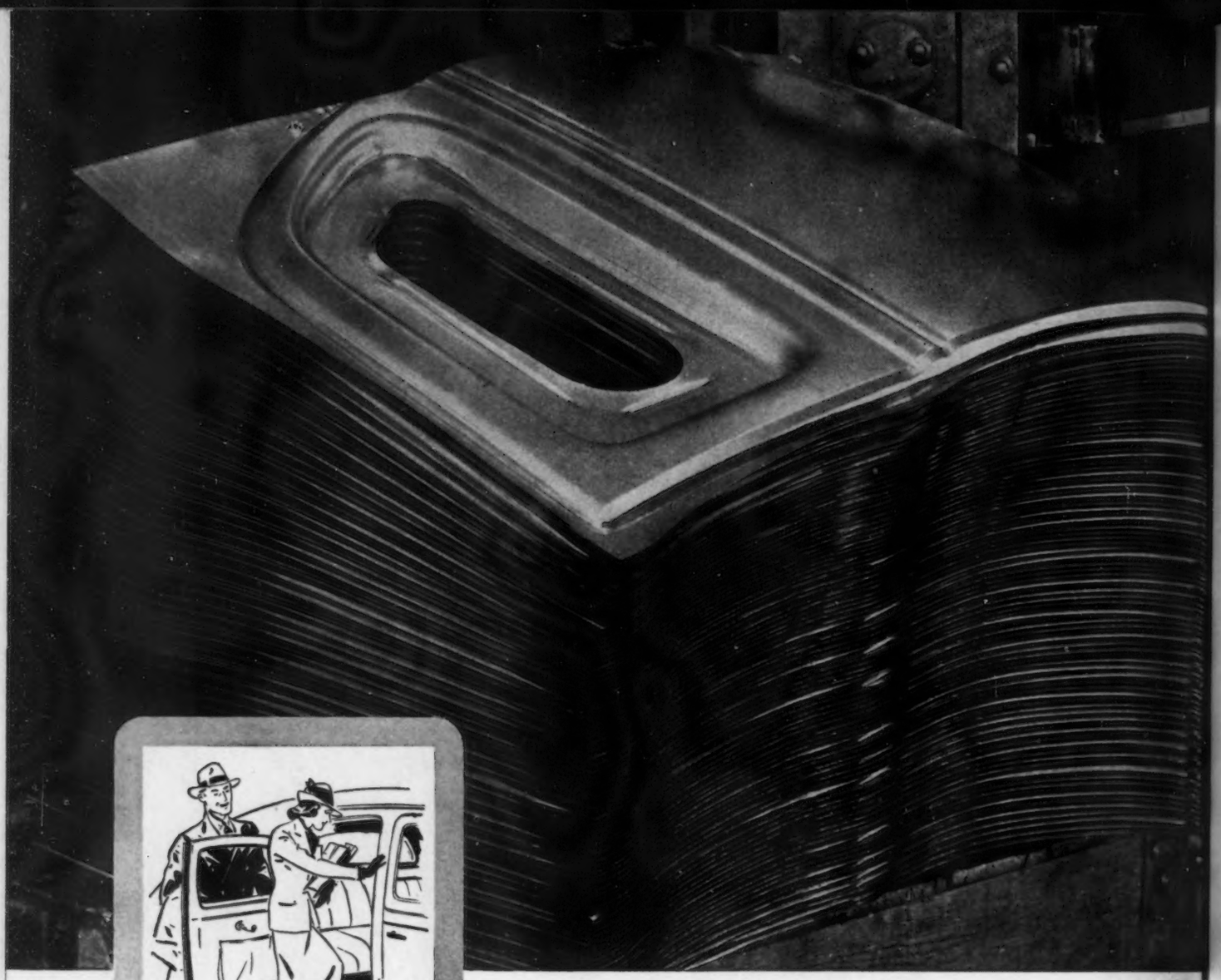
Because of its modest, unspectacular working methods the improved machine has been susceptible to misinterpretation, particularly by the lay public. And the more remote from the daily lives of laymen the machine happens to be, the more is it liable to be misunderstood or deliberately misinterpreted. If John Q. Public does not appreciate the day in and day out service of the mechanized modern subway, how much less does he realize his economic relation to lathes and continuous mills and broaching machines that he has never seen or heard of?

And John Q. Public, who would kick "like a steer" if someone proposed to raise the cost of subway transportation by decreasing its technical efficiency, does not realize that the legislative restrictions proposed for the use of these less familiar mechanisms would penalize him by increasing the cost of everything that he buys.

That is why The Iron Age undertook its present "public relations" campaign for the improved machine. Our problem, as industrial publishers, was the rather unique one of reaching people who do not read The Iron Age. And now, at the two-thirds mark of the campaign, we are ready to report progress. Through newspaper reprinting from coast to coast, house organs and other media, The Iron Age's story of the personal relation of the machine to John Q. Public has already been carried to over 20 million American laymen.

It has been a big job; but, judging by industry and public reaction, well worth the time and effort.





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INCLUSIONS IN RIMMING STEEL

By J. G. DUN and J. F. BEKOLA
Metallurgical Department, Republic Steel Corp., Warren, Ohio

RIMMING steel is widely used for deep-drawing purposes, and, since the inclusions it contains have such a direct influence on drawing properties, any study relating inclusions to performance is of great value. In this, the first section of a two-part article, the authors discuss sulphides and silicates, relationship between sulphide banding and inclusions, occurrence of silicate inclusions, etc.

THE trend for the past few years has been steadily toward substituting deep drawing for machining operations wherever possible. As this practice has become more and more universal, fabricators have found it increasingly important to have steel available which possesses uniformity from the first to the last piece to be put between the dies.

Steel makers, to meet such exacting requirements, have had to be on the alert not only to maintain existing high standards of quality, but also to improve the product wherever and whenever possible.

To secure a high-quality deep-drawing steel involves a number of factors, including surface and physical properties, as well as rolling and heat treatment. The type of steel which has been found most likely to have these properties, all of them important, is made by the rimming process.

Because rimming steel is so widely used for drawing purposes, and because the inclusions it contains have such a direct influence on its properties, it has been found to be very much worth while to study the inclusions and to observe their relation to actual performance in strip and sheet products.

The types of inclusions found in rimming steel fall into two general classifications: Sulphides and silicates. These types differ not only in composition, but also in location. The sulphides segregate principally in the upper portion of the ingot, while the silicates are to be found mainly in the bottom. The general consensus of investigators has been that sulphide inclusions are detrimental to all types of steel. However, the results of investigations by the authors would indicate that this effect is confined to rimming steel only and is due to the fashion in which the metal solidifies.

Sulphides

Included sulphur not only takes the form of manganese sulphide inclusions,

FIG. 1—Relationship between sulphide banding and inclusions. (Left) Etched electrolytically, showing segregated area. (Center) Etched with copper reagent, showing the presence of bandings. (Right) Unetched, showing distribution of sulphide inclusions.

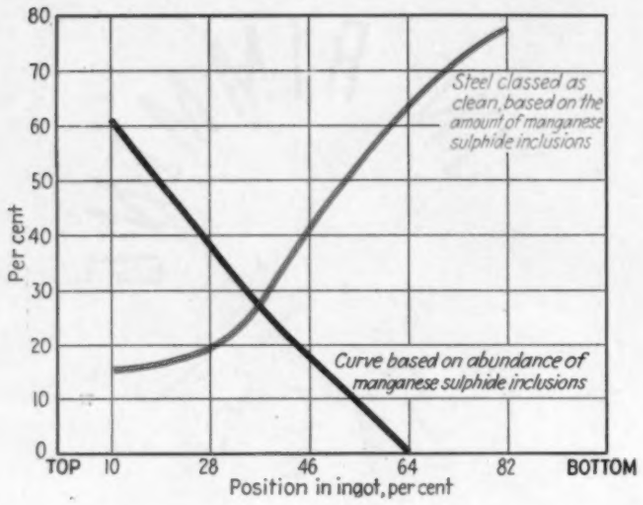

Steel classed as clean, based on the amount of manganese sulphide inclusions
Curve based on abundance of manganese sulphide inclusions
Per cent
Position in ingot, per cent
TOP
BOTTOM

FIG. 2 — Amount of sulphide inclusions in relation to position in ingot.

sulphides is greatest in the upper portion of the ingot. Progressing toward the bottom (see Fig. 2), there is a gradual decrease in the intensity of segregation, and at the bottom third of the ingot the condition has practically disappeared.

To illustrate this, the chart shown in Fig. 3 has been prepared, based on a systematic study of 96 rimmed ingots, representing 16 different heats. Tests

but also exists as a soluble segregate, which appears in the form of banding or ghost lines in the rolled product. The intensity of this banding is dependent upon the degree of deoxidation. In thoroughly killed steel it is eliminated, and in semi-killed steel its intensity is relatively low, It is evident, therefore, that oxygen in steel has an important bearing upon banding or soluble segregates.

As a rule in rimming steel, the intensity of banding is a pretty good indication of the extent of sulphur segregation in the ingot. In fact, the relationship between these sulphide phases is so close that neither can be considered separately. This is to be seen in Fig. 1, in which this relationship between sulphide banding and inclusions is quite evident.

As has previously been stated, the degree of segregation of the included

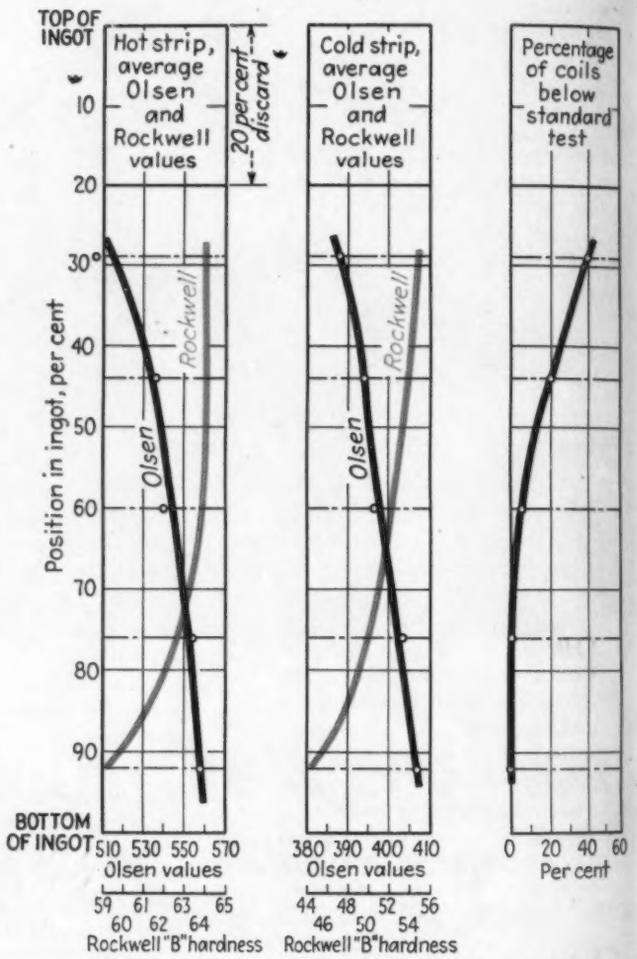


FIG. 5 — These data demonstrate that the change in physical properties from the top to the bottom of the ingot persists through the cold rolled and annealed state as well as for plain hot rolled steel.

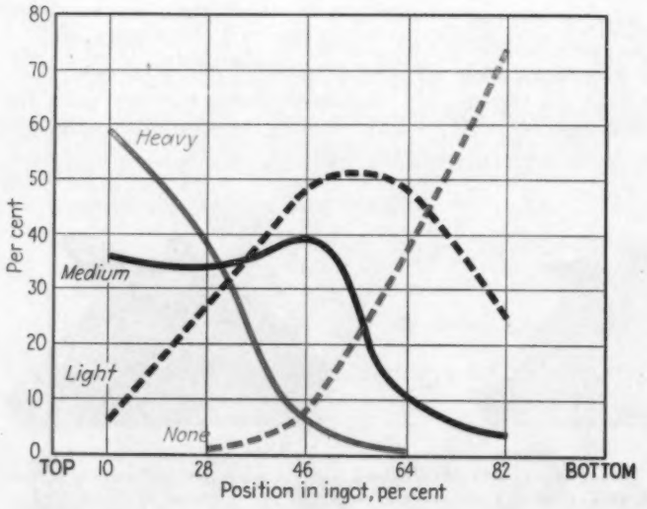


FIG. 3 — Banding in relation to position in ingot.

were taken from predetermined locations, each one representing a particular section of an ingot. The terms "heavy," "medium," "light," and "none," have been adopted to indicate degrees of segregation, and the micrographs shown in Fig. 4 were taken as standards for comparison. The top portion of the ingot represented in the chart is in reality the top after 10 per cent discard was made. The percentages specify the portion (from the extreme top) in which the tests were taken.

At 10 per cent from the ingot top

60 per cent of the tests displayed "heavy" banding, 40 per cent "medium" banding. At 46 per cent from the top (roughly from the middle of the ingot) the "heavy" banding came down to 6 per cent, "medium" remained about 40 per cent, and "light" banding increased to 49 per cent. About two-thirds from the top, the banding was "light" or vanished altogether. It was also found that the distribution and amount of manganese sulphide inclusions followed very closely the line of "heavy" banding.

demonstrates that the change in physical properties from the top to the bottom of the ingot persists through the cold rolled and annealed state as well as for plain hot rolled.

This can be most readily understood by studying the sulphur print, Fig. 6, of a longitudinal section of an ingot. The region where the columnar blow holes exist is the purest portion of the ingot, and its chemical analysis always shows a lower percentage of impurities than the ladle analysis,

At the end of columnar crystallization, dendritic solidification begins. Since this solidfication also starts with the purer portion of the metal, the remaining liquid gradually increases in concentration of impurities, at the same time moving upward and toward the central axis of the ingot. In Fig. 6 the dark areas, along the inner line of blow holes, which are at an angle to the central axis, show this entrapping of impurities due to the increased viscosity of the metal with falling temperature. This process continues un-

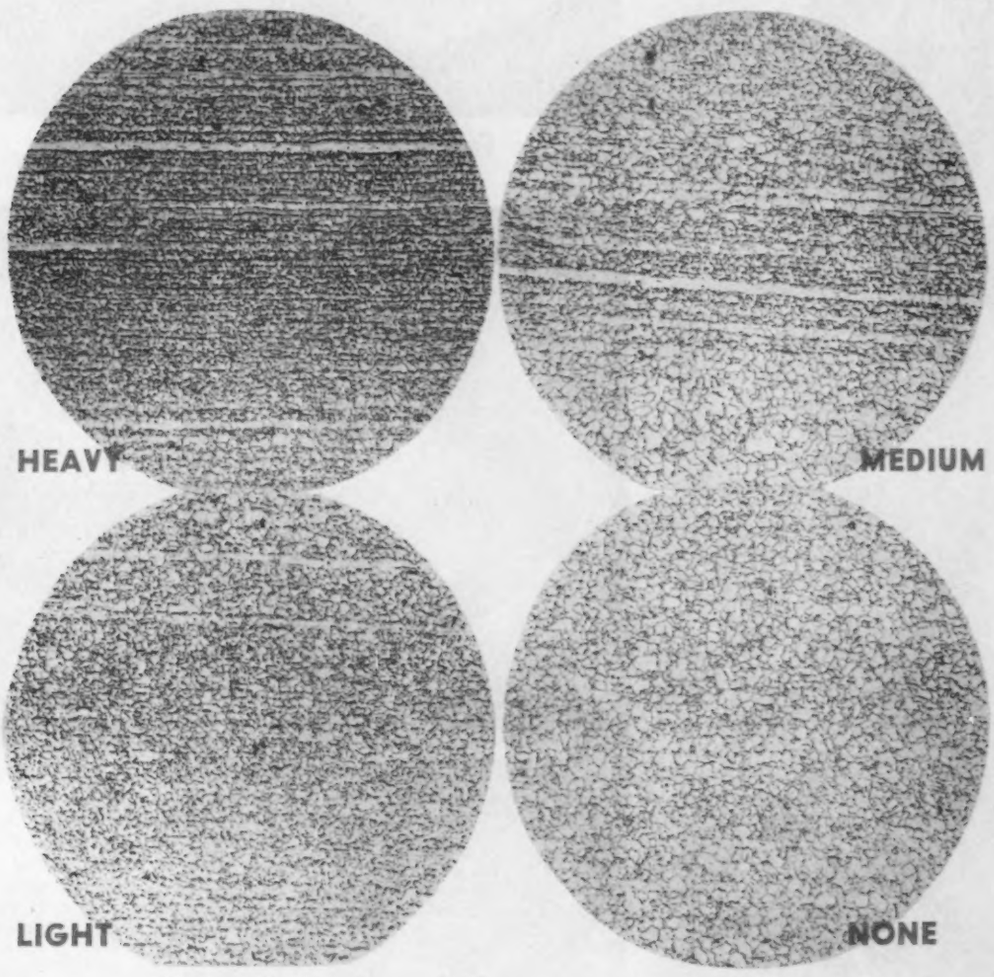


FIG. 4—These four standards are used to indicate the degrees of segregation.

It is quite obvious from the foregoing that a gradual change in physical properties should accompany the similar change in concentration and types of impurities. This change is from the greater hardness and lower ductility at the upper portion of the ingot to the lower hardness and greater ductility at the bottom portion. Fig. 5 is a chart which is a direct derivation of the following through processing of ten ingots of the same heat. It

which is the average analysis of the heat. This is undoubtedly because that portion of the liquid which solidifies first has the highest melting point, and is consequently purest. Its solidification increases the concentration of impurities in the remaining melt, particularly just before the growing crystals. During this period rimming action is going on, and a goodly portion of the coalesced impurities have been mechanically removed.

til the last bit to solidify, highest in impurities, is at the top central portion of the ingot; in Fig. 6, the dark area directly under the pipe cavity.

Silicates

Silicate inclusions, as a general rule, refer to silicates occurring in killed steels containing considerable silica and relative amounts of Al_2O_3. However, in rimming steel, silicates, consisting mainly of iron and manganese

FIG. 6—Sulphur print of a section through the central axis of a 22x24-in. ingot.

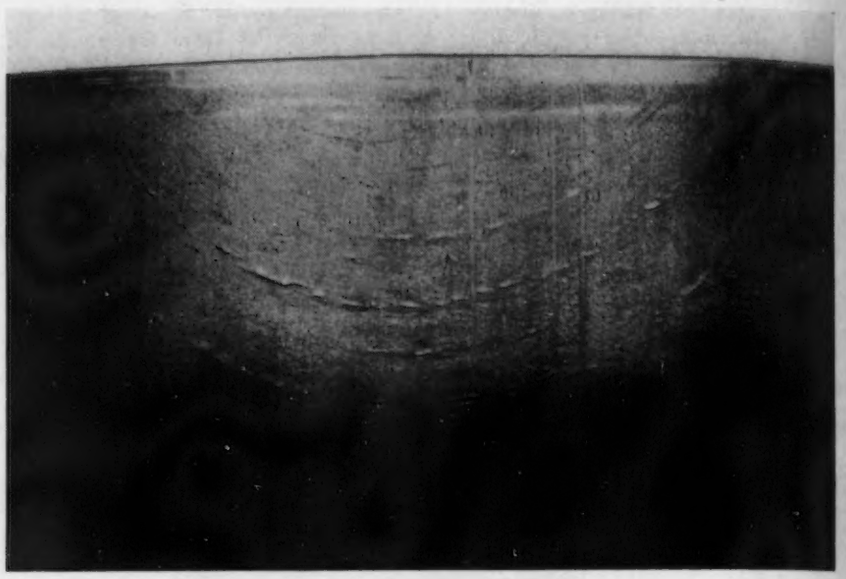


FIG. 7—Skin pipe in plain hot-rolled strip. Actual size.

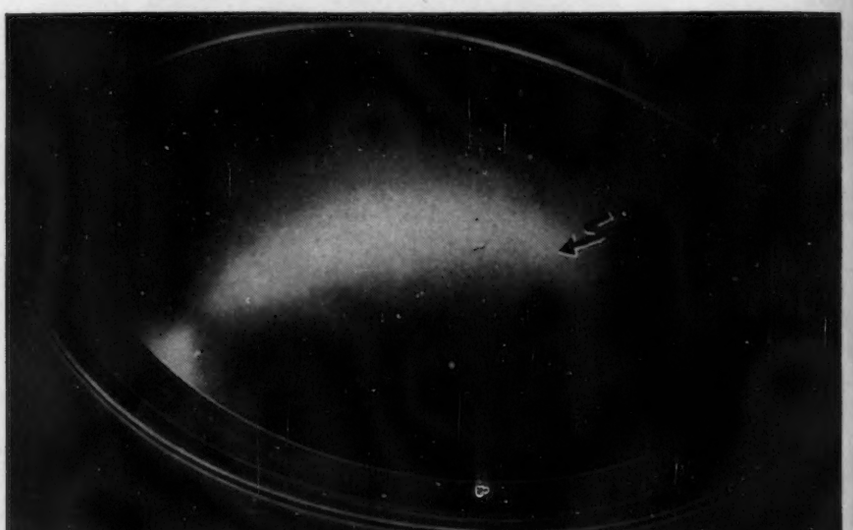


FIG. 8—Skin pipe in cold-rolled strip, indicated above by arrow. A close-up view of this same pipe is shown to the left.

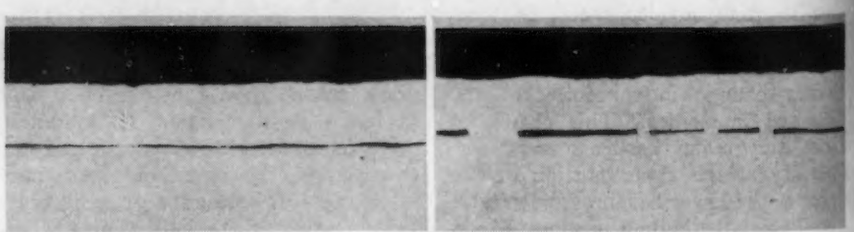


FIG. 9—(Left) Blister inclusion in hot-rolled strip. (Right) Same type of an inclusion after cold rolling. Note the breaking up of the inclusion. Both steels unetched and viewed at 100 diameters.

oxide with, relatively, a small amount of SiO_2 and Al_2O_3 are also present. Strictly speaking, it may be more appropriate to call them iron-manganese-aluminum silicates. The practical significance of this type of inclusion in deep drawing rimmed steel is illustrated by the examples of failure commonly known as skin pipe or small lamination shown in Figs. 7 to 10.

As a rule they do not possess a complex structure, but are present in the form of fusible glass. Such inclusions generally exist as thin films in the rolled product, indicating plasticity at the strip mill temperature. Under the reflecting microscope, these inclusions exhibit a monotone color of gray, and the difference in composition between one particle and another is not clearly discernible. However, when these inclusions are extracted, and examined under the petrographic microscope an altogether different appearance is noted. In general, all are transparent, but there is a great deal of difference in the comparative transparency of individual particles. The color of these inclusions also varies within a surprisingly wide range, varying from frosty white, through light yellow, pink and dark brown, to light green intermingled with opaque particles.

The occurrence of silicate inclusions was studied in three different ways: (1) by microscopic examination of ingot sections, using the micro-count method of determining the relative amount of inclusions present; (2) by microscopic examination of a large number of hot-rolled strips of which the position in the ingot was known; and (3) by blister tests in which small inclusions near the surface are disclosed in the form of blisters under severe pickling operations.

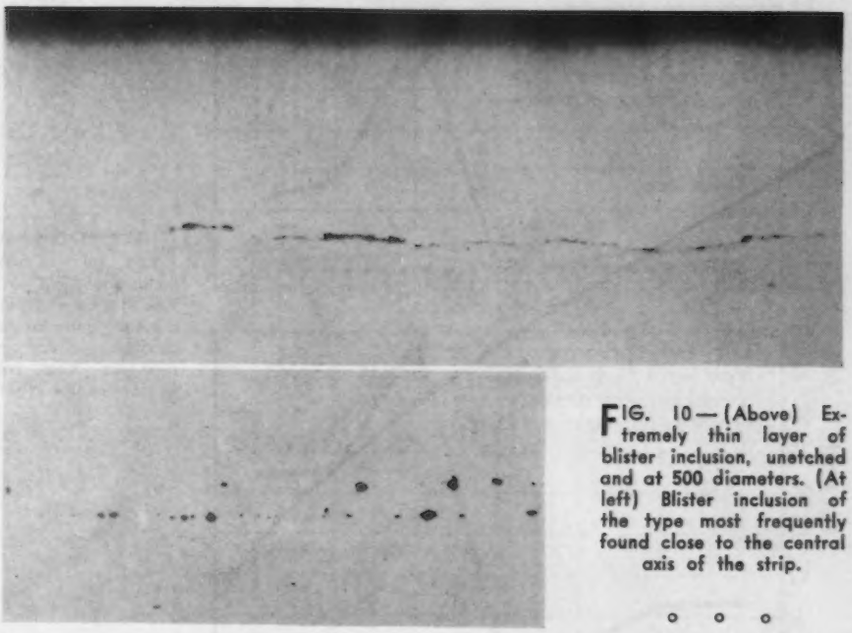


FIG. 10—(Above) Extremely thin layer of blister inclusion, unetched and at 500 diameters. (At left) Blister inclusion of the type most frequently found close to the central axis of the strip.

o o o

The distribution of silicate inclusions was studied by micro-count on a section taken 7 in. deep and at a point about 25 per cent up from the bottom of the ingot. As shown in Fig. 11, the size and number of inclusions within the first 2 in. from the surface are relatively small. An abrupt drop is noted in the next 2 in., then a sharp increase in both number and size in the fourth and fifth inches from the surface, after which there is a gradual decrease. In other words, the highest concentration of inclusions is between 4 and 6 in. from the surface of the ingot. The columnar blow holes are just previous to the concentration, and this high concentration of inclusions corresponds to the inner line of blow holes which is, roughly, in about 25 per cent of the entire thickness of the ingot. All the inclusions found in the ingot were spherical in shape, and under the petrographic microscope found to be forms of glass. Micrographs of the extracted inclusions are shown in Fig. 12.

The 96 ingots followed in the study of banding and sulphide inclusions were also utilized in the study of silicates by the second method. Samples from the known portions of the ingot were examined microscopically and the number and size of silicate inclusions in each were compared. This micro-count is entirely relative and because

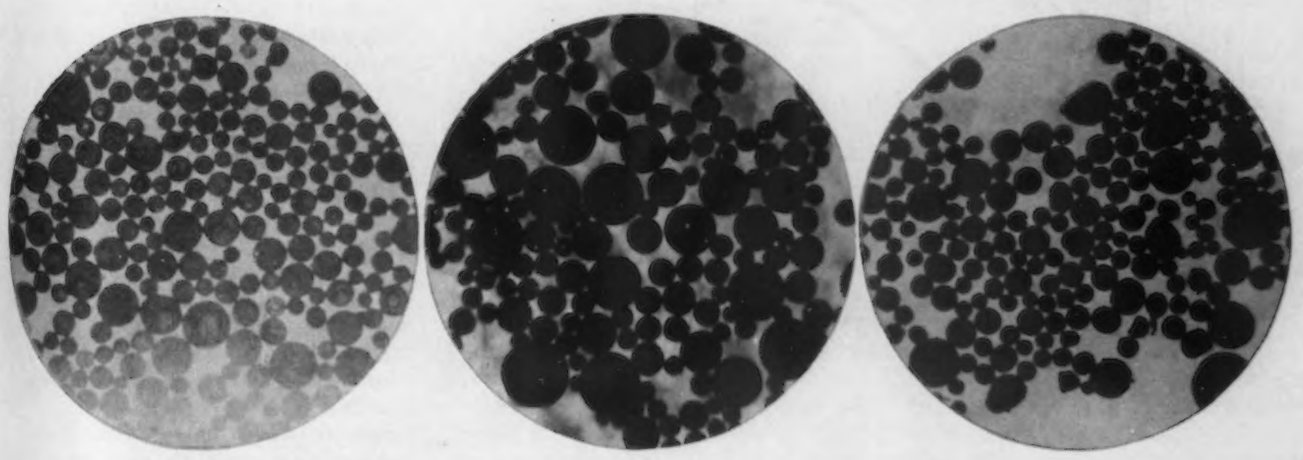


FIG. 12—(Left) Semi-glassy type of inclusion, extracted from the ladle tests; at 50 diameters. (Center) Opaque type of inclusion, extracted from the ladle tests; at 50 diameters. (Right) Opaque inclusions, extracted from the ingot; at 50 diameters.

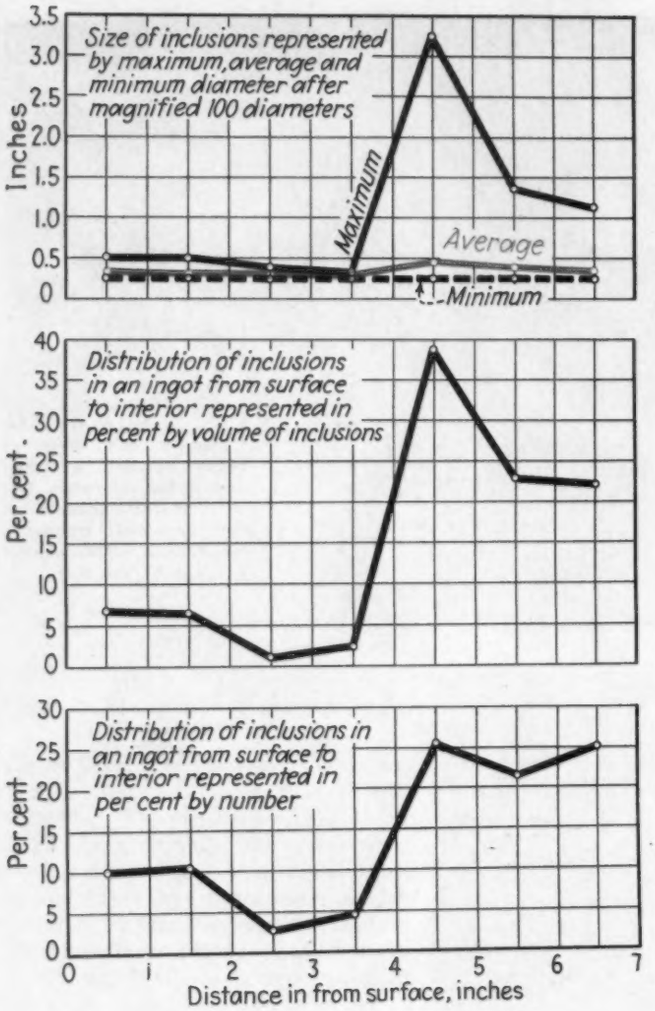

Size of inclusions represented by maximum, average and minimum diameter after magnified 100 diameters
Inches
Maximum
Average
Minimum
Distribution of inclusions in an ingot from surface to interior represented in per cent by volume of inclusions
Per cent.
Distribution of inclusions in an ingot from surface to interior represented in per cent by number
Per cent
Distance in from surface, inches

FIG. 11—Distribution of silicate inclusions on a section taken 7 in. deep and at a point about 25 per cent up from the bottom of the ingot.

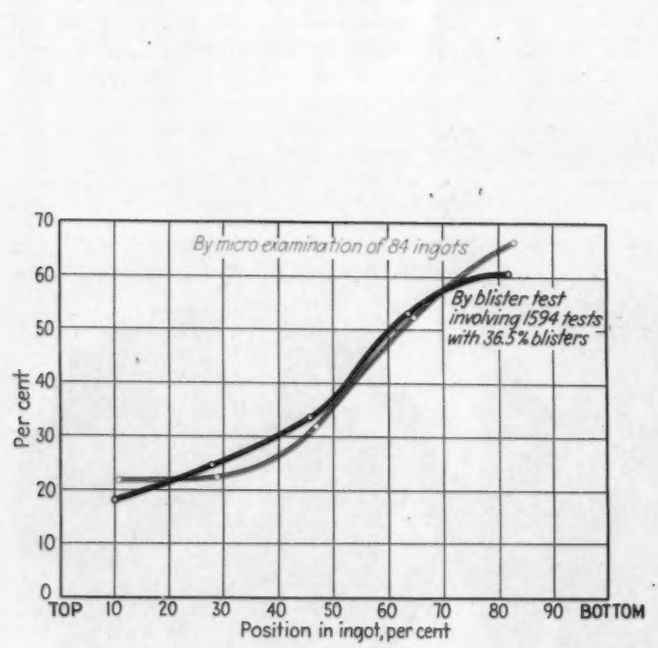

By micro examination of 84 ingots
By blister test involving 1594 tests with 36.5% blisters
Per cent
TOP
BOTTOM
Position in ingot, per cent

FIG. 13—Amount of blister and pipe forming inclusions, in relation to position in the ingot.

of the variation in the number and size of inclusions from ingot to ingot, and heat to heat, the actual figures cannot apply to any other single case. The most frequent occurrence of silicates was in the bottom portion of the ingot, and the majority of them were located between the surface and the center of the strip, or corresponding very closely to the zone of inner line of blow holes of the ingot. In addition, such inclusions were also found in the middle of the strip corresponding to the central axis of the ingot. However, they were fewer in number and the amounts did not increase sharply as the bottom of the ingot was approached.

The third method, severe pickling of strip samples from known locations in the original ingot, substantiated the results obtained in the two foregoing investigations. The results of this pickle test were accumulated over a period of two years and involved 4400 tests representing known positions in 880 ingots. The data from these tests are plotted in Fig. 13. The graph closely resembles the one obtained by microscopic examination. About 3000 of these blisters were opened to determine the condition underneath. Invariably inclusions were found, which in the majority of cases were brownish gray in color, and non-metallic in luster.

The large number of blister tests from known cuts of the ingots were made so as to determine how regular the curve from microscopic examination really was. The relationship existed consistently and can be taken as a general rule. This test also revealed that the amounts of blisters in the heats are relatively uniform. That is, the ingots representing the first, middle, and final portion of the heat produce approximately the same amount of cleanliness. Excluded from consideration, of course, are the last few ingots poured, since these quite often are accompanied by the slag in the pouring. The ingots used in the microscopic examinations, as well as those used in the blister tests, had their tops cropped off roughly 15 per cent. Therefore, while the results would appear to indicate the top as being most free from blister forming inclusions actually this is not the case. That particular portion does not show uniform results from ingot to ingot in the same heat. Oftentimes it is quite free from blister-forming inclusions; then again the inclusions may be very abundant. It appears that the cleanliness of the top 15 per cent of

the ingot depends entirely upon the mechanical entraption of the non-metallic particles, rather than the chemical reaction.

Six ingots with very small top discards were divided into 14 cuts each and tested in the same manner as the 880 other ingots. Inasmuch as the portions into which the ingot were divided were so much smaller than the others, the derived data are not included in the above, but instead are presented separately in Fig. 14. According to this, a zone in the middle of the ingot has the least amount of blister forming inclusions. If these ingots had been divided into five sections, the data obtained would have followed closely that of the 880 ingots.

Ed. Note:—Next week the authors will discuss the source of inclusions and the mechanism of inclusion formation.

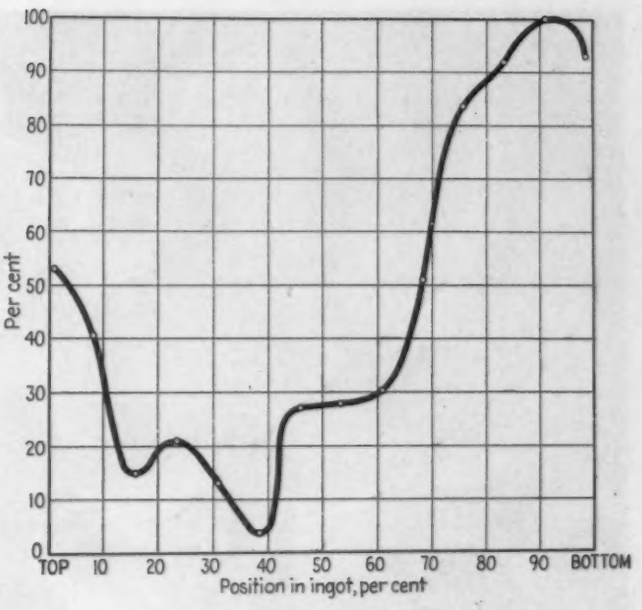


FIG. 14—Relation of position in ingot of autobody sheets to portion displaying skin blisters after test.

Rate of Oxidation of Steels

INTERFERENCE colors, or "temper colors," appear on metals when the thickness of the oxide film bears a certain relationship to the wave length of the incident light. By use of interference colors, therefore, relative thicknesses of oxide films can be compared. By this means, D. J. McAdam, Jr. and G. W. Geil have studied the influence of temperature and film thickness of the rates of oxidation of various steels.

In the July Journal of Research, National Bureau of Standards, Washington, the relationship between temperature, time, and film thickness, for each steel, has been represented by one or more views of a three-dimensional diagram. By means of these diagrams, it has been shown that the rate of oxidation varies as a high power (25 to 60) of the absolute temperature. The rate of oxidation, at constant temperature, decreases with increase in film thickness. If, over short intervals, the oxidation time is assumed to vary as a power of the thickness, the exponent decreases with increase in film thickness, from 100 or more to about 2. For constant oxidation time, the thickness increases rapidly with the absolute temperature. If, over short intervals, the thickness is assumed to vary as a power of the absolute temperature, the exponent increases with increase in film thickness, from 1 or less to about 20 or 25. The accelerating influence of temperature on the rate of oxidation thus predominates over the retarding effect of increasing thickness of the film.

By means of the three-dimensional diagrams, comparison is made between steels of various compositions, and a discussion is given of the influence of alloying elements on resistance to oxidation at elevated temperatures.

The rate of oxidation depends on the rate of diffusion of oxygen inward and the rate of diffusion of metal outward, through the oxide film. The rate of diffusion of oxygen, therefore, is proportional to the range of oxygen concentration and to the specific diffusional conductivity of the oxide. The steepness of the gradient of oxygen concentration decreases with increase in film thickness, but the instantaneous rate of oxidation is not inversely proportional to this thickness. The decrease in the rate of oxidation with increase in film thickness is too great to be in accordance with the view that the range of concentration of oxygen and the specific diffusional conductivity are invariant with film thickness. Either the range of oxygen concentration or the specific diffusional conductivity, or both, must be greater for thin than for thick films.

Action of Latex on Al

A film of rubber applied in the form of latex is sometimes used as a means of protecting the polished surfaces of metallic mirrors and similar articles from scratches and dust while in storage and during shipment. When ordinary commercial latex is applied to polished aluminum, however, a bluish discoloration is produced which remains when the film of rubber is stripped off, according to a recent report of the National Bureau of Standards.

Tests which were made to ascertain the cause of this discoloration indicated that it was produced, not by the rubber, but by ammonia which is almost universally employed as a preservative for latex. When the ammonia is removed by dialysis through a cellophane membrane, latex no longer discolors aluminum. Ammonia-free latex preserved by the addition of the requisite amount of pure formaldehyde is likewise without action on aluminum.

METAL

By THEODORE J. SALOW, Jr.*

IN recent years a number of engineers have recognized the fact that metal spinning has a great potential usefulness in industry **IF**:

(1) its range could be widened to include ferrous metals;

(2) its scope could be expanded in order to form intricate shapes in hard modern alloys;

(3) and if this work would measure up to exacting industrial standards of precision.

It has long been known that substantial savings in production costs often might be gained and in many instances a distinctly superior product formed, if the three important objectives just mentioned were to be realized.

In certain plants the art of spinning has been so developed as to meet the three objectives mentioned, and the process is being exploited by a rapidly growing list of industries, which have become conscious of the advantages provided by this technique of forming metal. Really complex spinnings in practically all metals are now being used in aircraft, automobiles, machines and tools, by ornamental metal works, and by a long list of manufacturers of food processing equipment and builders of capital goods equipment.

For industrial purposes there have been three standard methods of forming sheet metal. For large volume production, stamping has been and still is the most economical means of mechanically forming seamless shapes. Possible in some work, but seldom used, is the old smithy method of pounding metal out by hand. Filling the gap between the latter one-at-a-time means of production and the former 100,000-at-a-time method is metal spinning—a process of forming metal that provides for the production of articles in small lots at nominal costs.

A simple spinning may be turned out by a skilled craftsman in a few minutes time. The machine used is a lathe, somewhat similar to a wood-turning lathe but faster and more powerful. The first operation is to turn a wood or metal block to the exact size and shape of the object to be produced. Such a block serves the same purpose in spinning that a die does in stamping. The block can be used to make thousands of spinnings, and the original cost is very small compared to the cost of a die.

The block is screwed to the spindle of the spinning lathe. A round, flat metal blank is clamped against the block. The lathe is then started, causing both the block and the blank to revolve, or spin, at a high rate of speed.

* Ed. Note:—The author is general manager of the Milwaukee Metal Spinning Co., an outstanding exponent of this technique of forming metal and originator of many of the important advances recently made by this relatively unknown and certainly little understood branch of the metal working industry. Mr. Salow has stated a willingness to handle by direct correspondence any questions readers may wish to have answered.

SPINNING COMES OF AGE

Now, many formed metal articles may be spun—quickly, at low cost, and with superior finished characteristics. This article gives the why, the what, and the how.

The spinner selects a tool, usually a long, blunt steel rod, the blunt end of which he presses against the whirling blank. By expertly working the tool back and forth from the center to the outer edge of the blank, he finally lays the metal down so that it fits over the block like a glove. The spinning is taken off the block, another blank is clamped on, and the spinner starts again. Simple articles require but one operation; an intricate article, however, may take several operations and anneals before it is finally spun to the correct shape.

The various steps involved in spinning a simple shape are illustrated Figs. 1 to 8.

Spinners Are Artisans

Perhaps the most important single factor in spinning is the individual skill of the operator. The variation of pressure to form desired shapes, to obtain correct thicknesses of metal, and to avoid "work-hardening" is by rule-of-thumb, or "feeling" an operator has for his work. This "spinning temperament" requires an artisan in the full orthodox conception of the word. Like every other measurement of professional ability, the human equation in a shop largely determines its capacity for work.

As skill is dependent on individualism, so also are the forms of the tools used and the technique followed in applying them. The operators of modern spinning lathes use many of the common tools, but in the past few years a great expansion in types of work handled has required the development of a wholly new kit of gadgets, particularly those for working ferrous metals. These tools have been custom designed to bring about certain desired results and reactions in metal and are "stock-in-trade" that are very closely guarded. In a business where individual skill and "knowing how" are the vital elements of success, progress and betterment in methods are kept "under wraps" for the same reason that competitive business and industry strive to obtain copyrights and patents on personal or corporate achievements.

Limitations Removed

Until a few years ago, spinning was confined wholly to non-ferrous metals such as aluminum, copper, pewter, zinc, brass, etc., and the shapes to be formed were limited to very simple designs. From this stage, where spinning had been almost relegated to a recreational project for home workshop enthusiasts, a group of independent minds refused to accept as final the established boundaries and began to pioneer wholly new fields. Experiments were launched on working sizes heretofore considered impractical for the spinner's lathe. Investigations were started to determine if the whole long list of so-called unworkable metals really could not be spun. All of the hurdles were one-by-one successfully cleared. Characteristically, much of this "spirit of inquiry" was depression born, spurred on by the necessity of finding new markets to turn idle wheels.

The first experiments were directed toward increasing the gage of non-ferrous metals to be handled. Only a few years ago, for example, the ability to spin copper 1/16 in. in thickness was considered remarkable. To handle copper of heavier gage made it necessary to find methods that would, in the language of spinning, "bring the metal down in a hurry," so that its ductile qualities would not change under the heat of forming. To do this, new tools had to be developed, new spinning speeds determined, etc. Today, these answers are known—and now copper ¼ in. in thickness can be spun without difficulty.

As new tools were developed for increasingly heavy gages of non-ferrous metals, they were applied—with adaptations—to modern ferrous alloys that had previously been wholly beyond the ability of the spinning lathe. Results were highly gratifying. As metal after metal was introduced to the spinning lathe, the industrial application of the spinning technique broadened constantly. The greatest victory of all, however, came when stainless steel was for the first time spun successfully.

Spinning Stainless Steel

Despite the fact that stainless steel theoretically is a ductile metal, it had

FIG. 1—Small spinning lathe with maple pattern (block) attached to spindle.

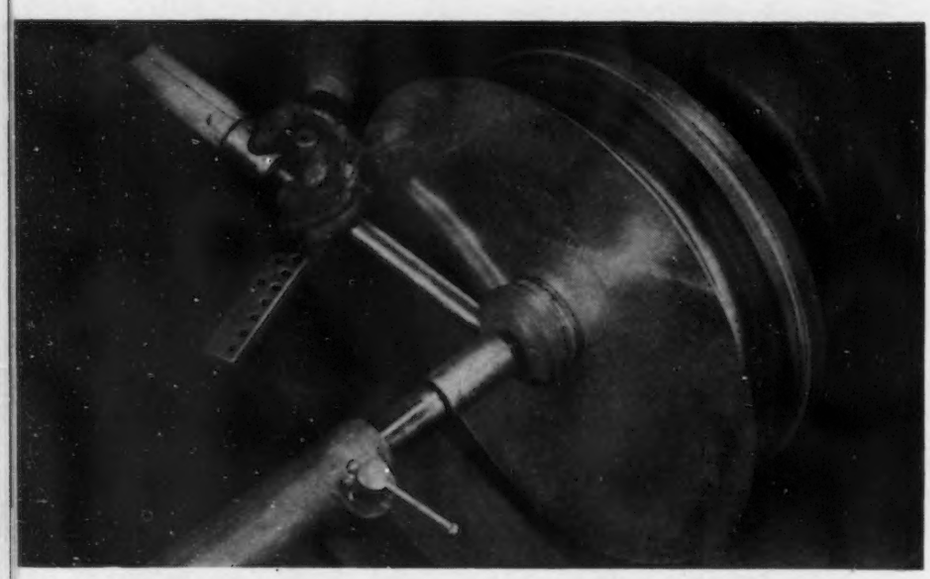
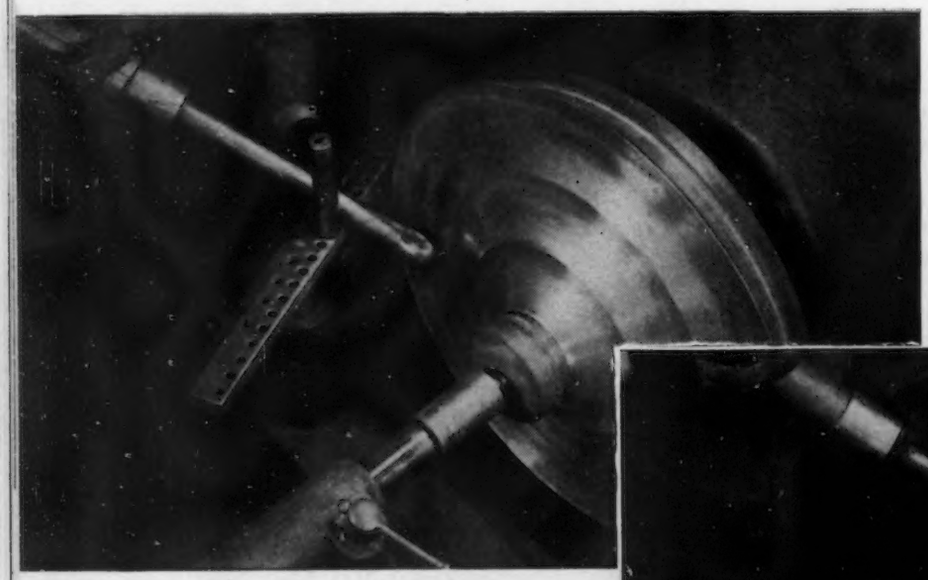


FIG. 2—Operator prepares to spin aluminum blank clamped against block, both revolving at 2600 r.p.m.



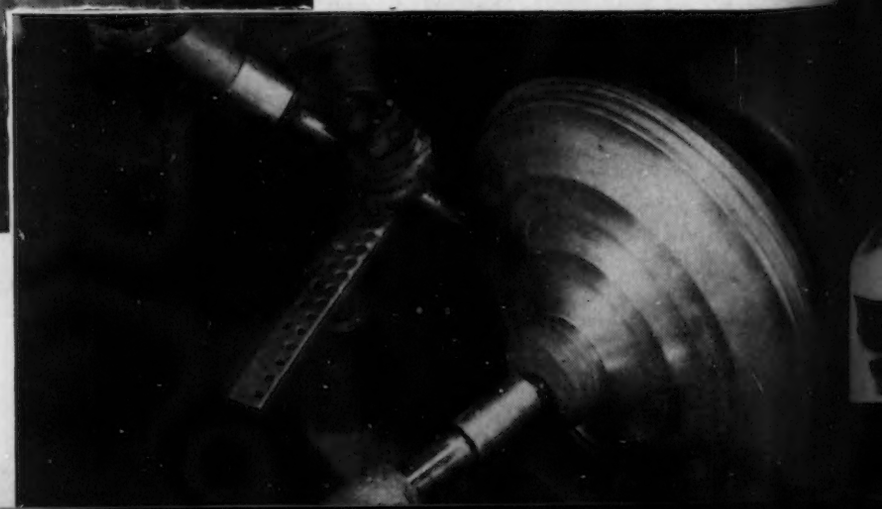


FIG. 3 (Above)—Operator presses tool against metal and it assumes shape of block. Fig. 4 (At Right)—Operator prepares outer edge for trimming.

always shown a discouraging tendency to work harden rapidly on the spinning lathe. Long after the stamping industry had developed methods to form the metal into various deep shapes, the spinner still found it an impossible metal to handle. Finally, after years of endless experiment concluded in 1932, it was found to be commercially feasible to form a few simple shapes. Since that time, advancements in handling technique have been extremely rapid, and have made possible the working of really complicated forms.

Just how fast and how far spinning stainless has progressed may be judged by the fact that only 12 months ago the spinning of a flanged and dished head was regarded with open-mouthed wonder. Today, it is not out of the ordinary to form a 42-in. diameter ball out of 14 gage steel.

Valuable contributions to the technique of stainless spinning were made by a number of the leading producing mills. Characteristically, these companies made available for this research the facilities of their laboratory resources and the personal time of metallurgical technicians. Many special melts were made in test furnaces to improve the ductility of the metal, and the resulting improvement in steel —based on the knowledge gained from this work—has been an important factor in the rapid progress recently made in forming and spinning difficult shapes.

Much Larger Sizes

As spinning advanced into this new field of ferrous metals and alloys, it was matched by corresponding progress in handling sheer physical size. A spinning 36 in. in diameter was considered a phenomenon a few years ago. Today spinnings as large as 90 in. in diameter are regularly being

formed, and the trade believes that the maximum in size has not yet been attained.

Right now spinning is in the throes of its own "industrial revolution." Accomplishments that only a year ago bordered on the sensational have already become a daily commonplace. Items considered impossible to make even a few months ago are being regularly produced today. In short, industry as a whole must regard spinning as a field of forming metal that lacks all finality as to its boundaries.

Some of the commercial applications of these newly discovered methods are extremely interesting. The experience of a paper cup manufacturer provides an illustration that has been frequently duplicated.

This particular manufacturer required stainless steel mandrels for the production of the cups. The company was accustomed to purchase stainless castings which were then machined to specifications—a process that was both expensive and wasteful of material. Spinning was investigated and samples produced for testing, and these spun mandrels were extremely satisfactory, being very strong and durable. And not the least of this manufacturer's satisfaction with spun mandrels was the fact that they were produced at a cost 80 per cent less than those made by the old machining method.

Aircraft Use Developing

Another interesting application of spinning can be found in the production of stainless steel engine cowls for an aircraft maker—a forming operation requiring a fairly large piece of metal in contrast to the very small size of the paper cup mandrel. The aircraft company wanted a fire wall housing made of a heat-resisting alloy, and tests indicated that stainless steel

FIG. 5—Operator beads. Notice bead is smooth, well rounded and clean cut.

FIG. 6—Complete spinning is removed.

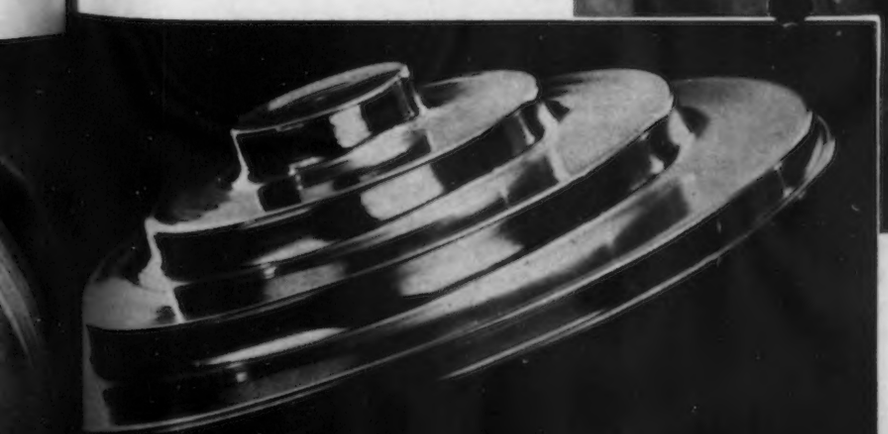


FIG. 7 (Above)—Final inspection for accuracy. Fig. 8 (At Left)—The completed cover, which requires practically no polishing.

would best meet the requirements. However, the cost of producing a stainless 36-in. diameter cowl was entirely out of relation to its proportionate importance as a plane part. Finally, spinning was suggested, tried, and found wholly successful not only in forming a structurally strong cowling, but in bringing the forming cost down to common sense levels.

Stainless Spinnings Help Food Industries

One of the largest consumers of stainless tonnage is the food and beverage industry and related suppliers of processing machinery and equipment. The adaptability of stainless for this particular market is too well known to require explanatory comment, but the contributions of spinnings to the betterment program of equipment manufacturers is worthy of interest.

In this field the production of many vessels for holding liquid and semi-solid foods does not warrant the costs of dies. This is true of both the largest manufacturers as well as the smaller. Containers were produced by welding until spinning showed its ability in producing bowls and tanks. Spinning produced seamless vessels that were very satisfactory in every respect, and again, as in many cases where spinning has been applied, a product improvement has been made more realistic by a lowered cost of production.

The initial application of stainless spinning in the food industry was in the forming of covers for filling and capping machines used by dairies in the bottling of milk. (See Fig. 9.) Prior to the introduction of stainless, these covers were traditionally made of copper and then chromium plated. Subject to continually hard daily use, the chromium finish would wear away. This necessitated frequent replating costs, reserve covers, and other extras that added to the cost of operating a dairy.

Sanitary Standards Raised

The use of stainless covers, of course, removed the curse of re-plating and created an attractive appearance that would at all times impress on visitors the sanitary standards of the dairy. Even more pleasant, however, is the fact that these better spun stainless covers are lower in cost.

Recently, spinnings have had the opportunity to team with a brilliant engineering advancement in the dairy industry, the result being a wholly new piece of equipment. A few years ago a machine was introduced that injected vitamin content into milk, a distinct sales asset. Milk thus treated was known then and still is identified as irradiated Vitamin D. However, small dairies could not afford the very large capital investment required by the machine. A year or so ago another machine was perfected, that operated successfully and could be sold at prices within the means of even small dairies. However, this machine was generally condemned by sanitary authorities because certain essential parts were produced by a method of double seaming, soldering, and welding. Spinnings were suggested as a solution to the problem of fabrication that would pass all health department requirements. The machine is now being made with spun parts.

Spinnings are important to the food and beverage industries for the greater strength seamless construction provides over general sheet metal fabrication. Also, smooth, highly polished seamless construction makes absolute sanitation in washing attainable, and leaves no opportunity for cracked or rough surfaces to harbor refugee bacteria. Health authorities everywhere have approved and recommended the seamless vessel or bowl.

Metal spinnings, being nominal in cost and because the ranges of metals, weights, and forms are broad, can and do play an important part in experimental and laboratory work. Any cylindrical shape—even whole spheres—can be formed by spinning. If design or parts changes are under consideration — and curved streamline form is now helping sell all products—the making of test models by the spinning process is less costly. Many alert

FIG. 9—A tank for a bottle filling machine which is spun of 16 gage 18 and 8 stainless steel.

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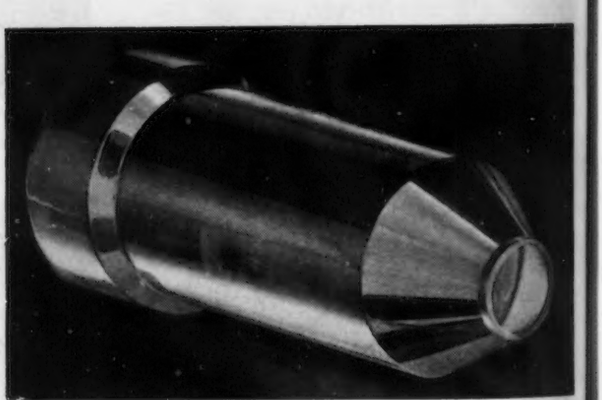

FIG. 10 — A diesel engine injector sleeve spun of copper 0.109 in. thick—tolerances are extremely close.

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stamping companies have now turned to spinnings to form sample models for customer approval before expensive final dies are undertaken.

Many good ideas on product improvement have been prematurely consigned to the grave because prohibitive forming costs have outweighed the possible resulting gains. Spinning may afford a practical answer to many of these engineering headaches. By this method, almost any metal can be formed at a cost that is in line with limited experimental funds.

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FIG. 11 — A miniature scale model of a steel beer barrel that is an exact copy of the finished product.

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Exacting Specifications Met

Many industrial engineers have the impression that when spinning is employed as the method of spinning metal, a considerable degree of latitude must be expected in the finished product. It is generally believed that spinnings serve certain purposes satisfactorily, but when exacting specifications must be held, spinnings can not be depended on for accuracy.

As spinning has "raised its sights" to include practically all metals and found itself able to work increasingly larger sizes, so also has parallel progress been made toward controlling the accuracy of finished work. A modern spinning plant now can hold metal to almost any set of specifications, all the way down to micrometer measurements.

Take for instance the diesel engine, which is an extremely accurate piece of mechanism. One diesel manufacturer recently needed just a few injector sleeves for a special motor. On checking various methods of producing these essential parts, it was discovered that the cost ran into hundreds of dollars. However, on investigating spinnings it was found that prices were well within the budget. Spinning produced the sleeves successfully (see Fig. 10)—made them of copper 0.109 in. thick with extremely close tolerances. Considerable money was saved, and this particular manufacturer has turned to spinnings for the forming of special parts.

Scale Models For Salesmen

From time to time spinning has helped salesmen "turn on the heat" to secure business that might otherwise have been placed elsewhere. Where products are bulky, heavy, and awkward to carry, a spinning made to scale and faithfully reproducing every characteristic of the product can be employed to help prospects visualize the actual article.

At the time prohibition was repealed and beer legalized, a steel products manufacturer visualized a potentially large beer barrel market. This company had never made barrels, but had the facilities. Tooling up for production would involve a $10,000 expenditure, and after that there was no assurance that brewers would approve of the product when once made. Another deterring element was the essence of time, the fact that the big bulk of the barrel orders would be placed by breweries before the first barrels could be produced for even demonstration purposes.

From a blue print of the proposed barrel a spinner produced a miniature scale model (see Fig. 10) that was an exact replica, in characteristic and metal, of what the finished barrel would be like. (See accompanying illustration.) Within 48 hr., 24 of these barrels were in the hands of the factory sales force. Instead of a hazardous spending of $10,000 on a hunch or guess, this steel products plant obligated itself to pay for only 24 spinnings, the cost being $212.00.

Ornamental Architecture

The modern trend in architectural design frequently calls for the use of rounded shapes in interior or exterior design. Stainless metals are being increasingly exploited, and it is rather likely that this trend will grow increasingly important. Already spinnings have been employed by some architects and contractors to supply the cylindrical and spherical forms created by the draftsman's pencil. As the knowledge of spinning as an economical source for this type of work is realized and appreciated, designers will probably make liberal use of this forming technique.

WHAT'S YOUR

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REGARDING the method of presentation and the application of a point rating plan to the actual grading of a job, all such plans seem to fall into three general types:

RATING FROM LISTS OF KEY JOBS: The first type consisted of selecting a few factors, normally about five or six, and about 10 or 15 key jobs which are ranked under each of the factors selected. A scale of points may be given to each of these lists, varying either by cents per hour or some other arbitrary set of values, which aid in locating a new job in relation to the key jobs under each factor. As may be seen, this method consists merely of comparing one job with a standard set of jobs under each factor and adding the total points. The General Electric plan as published by Mr. Weed, the plan published by A. W. Bass, and plan known as the Job Factor Comparison Method published by E. J. Benge, are good examples of this type. These plans are far superior to simply ranking without considering the factors, for they approach the method of fundamental analysis, and provide point scales for locating a particular job in some definite location in the list. They lack descriptive definitions, however, to aid in locating or point rating the job.

RATING FROM DEFINITIONS AND DESCRIPTIONS: The second type includes those which have numerical scales assigned to factors, but use definitions to determine the relative degrees by which each factor affects the particular job. The Rositzke plan is perhaps the best known example of this type, and since this plan is intended for use by professional engineers, it would not be expedient to have specific lists of key jobs under the various factors which might lead a prospective customer to think the plan was more adaptable to some other business than to his own. This omission of the job lists gives the impression that the plan is more universal, and not limited to any one industry. It cannot be denied, however, that lists of comparative jobs are important aids in job rating.

COMBINED DEFINITIONS AND KEY JOBS: The third type of plan includes those which have combined the desirable features of both the other types. They use fundamental factors as a basis of analyzing the job, with both relative definitions and lists of key jobs to aid in selecting the proper point value for the job in question. There are two outstanding examples of this type of plan. First, the occupational rating plan as published by the Industrial Management Society and first presented at the Midwest Industrial Management Conference on April 23, 1937, and second, the job rating plan published a few months later, January, 1938, by the industrial relations department of the National Electrical Manufacturers' Association.

Popularity of the Plans

It was found that many individual companies had either adopted one of these plans directly, or had used one of them as a model for a plan somewhat more specific to their own company. In some cases the same factors were used, with the same basic definitions, but with considerable amplification in more detailed definitions, and more specific examples peculiar to their own individual cases. In some cases, the point values had been altered to correspond with different opinions of the relative weightings of the various factors.

At present the relative popularity of these two plans seems to be about equal. The NEMA, however, has done a great deal of excellent work in developing a complete system of definitions applicable chiefly, of course, to the electrical manufacturing industry, a rather definite procedure for systematic wage surveys, and a generally well organized plan of installation. In this respect, NEMA probably has some advantages over the IMS.

Quoting one manufacturer—"Relative to recent developments in job evaluation, the Industrial Management Society plan is probably the most pretentious and comprehensive work which has been published." Another manufacturer writes, "The NEMA plan seems to be one of the most complete plans available." And, quoting Dr. J. E. Walters, of the personnel department of Purdue University, from his paper on job evaluation published in *Mechanical Engineering* for December, 1938—"To judge from this study, more companies are modeling their job evaluation systems on those two plans than on any others."

IMS and NEMA Differences

Although these plans are somewhat similar, there are some interesting differences. Regarding the number of characteristics, NEMA has 11, while IMS has 23. This means that NEMA will grade a job probably a little more quickly, but the IMS plan gives more thorough consideration to all the fundamental phases of the job, and the greater number of factors tends to equalize errors in any one factor. The NEMA plan provides five possible classifications under each element. This also contributes toward quicker grading, but lacks the flexibility of the continuous scale of the IMS plan. The NEMA plan provides for a ceiling, or maximum number of points,

JOB WORTH?

By H. BARRETT ROGERS
Assistant Professor of Industrial Engineering, Purdue University

LAST week the author described the operation of ranking and point rating plans. In this, the second and last section of this article, the author first describes the three general types of presentation and administration of a point rating plan. In addition, information is given on sex and color differentials, manner of installing a plan, costs, etc.

thereby limiting the application of this plan to the range of jobs on which it was originally constructed. The IMS plan has no ceiling, and hence is not limited in its application. NEMA attempts to measure experience by the total learning time for the job. No definition for learning time is given, however, and no indication as to what part of a person's life or at what stage of his experience that learning time is supposed to begin. On the other hand, the IMS plan is based on the fact that the term "experience" can be defined in so many different ways that it does not give a clear-cut basis for common understanding. More fundamental factors are used, therefore, such as: Period of adapting one's self to a new company; specific types of knowledge; dexterity; precision; versatility; etc., each of which can be adequately defined and easily comprehended.

Sex or Color Differentials

Another fundamental difference in the two plans is the policy regarding different wage scales for male and female labor. The NEMA plan provides for different wages for men and women supposedly doing the same work. In the classification system of grading as used by that plan, it would be difficult to show different grades for men or women doing somewhat similar types of work, and casual observation of the jobs might fail to indicate any actual differences. With the more detailed consideration of the actual jobs as made available (and even required) by the IMS plan, actual differences will be detected in the jobs and in the resulting point values, thereby eliminating the necessity of different wage scales. It certainly is not in line with American democratic principles to pay different wages for exactly the same work (*if* it is exactly the same) merely because of a difference in sex or color.

Corroborating this reasoning, is a paragraph taken from a "report on classification and compensation of positions in the service of the Commonwealth of Virginia," made to the Governor, by Griffenhagen & Associates, June, 1937, Richmond, Division of Purchase and Printing.

"Some ground for differences in pay as between women and men and as between white and colored workers was found. But no provision for such differences was incorporated in the compensation plan because the plan is based on the classification plan, which is founded on the basic principle of like pay for like work. In the application of this principle, the authors of this report found themselves entirely unable to say that the work of positions of any class found to be of such and such a value in relation to the values of those of other classes, should be treated as worth one rate when performed by an employee of one sex or color, and an entirely different rate when performed by an employee different in one or both of these respects. The compensation plan thus provides a single salary scale for each class of positions, regardless of the color, sex, or other personal characteristics of the incumbents."

Generally speaking, the NEMA plan is simpler, and therefore probably more quickly and more easily applied, although possibly somewhat limited in its scope. The IMS plan is more complicated, more thorough, and probably more universally applicable. As mentioned before, it is up to the manager to decide how good a job he wants done when he selects the plan he wishes to use.

Installation of Any Plan

It should be of value to outline the steps required in the installation of any good plan.

JOB DESCRIPTIONS: The importance of getting adequate job descriptions can not be emphasized too much. The plan and its application can be no better than the descriptions of the jobs from which it works. The most satisfactory practice seems to be to send brief questionnaires to the individual employees asking them only for specific facts about their jobs. A standard form should be used which is built around the factors used in the plan. A slightly different questionnaire should be filled out by the foreman wherein he is asked for qualitative opinions on learning time, experience, etc. for the various types of jobs in his department. Also this gives a clue as to the *number* of *different* jobs that need to be rated.

These questionnaires are then reviewed by the job analyst who uses them as introductions and background for personal interviews with each operator about his specific job. From all these data, the job analyst should then write up uniform types of job descriptions for rating the jobs. These descriptions should be written in such a manner that they can be used readily by the personnel man as records of job requirements for hiring new employees, and perhaps should include

suggestions for questions on tests regarding the adaptability of the prospective employee, also lists of specific physical requirements for unusual jobs.

EVALUATING KEY JOBS: Regardless of the key jobs which may be listed in the master rating plan, it is good practice to rate a few well known jobs and keep them constantly available for reference while grading the remaining jobs. This method has been found to save much time when grading questionable jobs, and in all cases improves the consistency of the work.

WHO DOES THE RATING OR EVALUATING: From the survey, a composite opinion seemed to be that the grading should be done by a committee rather than by one or two individuals. In order to cover departmental boundary lines, this committee should be headed by a chief job analyst who, for this purpose at least, reports directly to the president. The committee should further consist of departmental superintendents, foremen, the personnel men, and representatives of the workmen. This sounds like a high priced committee for this type of work, but from one of the large steel mills, where all this work was done by the superintendents, came this statement: "Proceeding a department at a time, these conferences and the work of analyzing, briefing, and comparing statements preparatory to them, required several months. Incidentally, it may be mentioned that these conferences, aside from the work that had a direct bearing on the rate problem, proved to be one of the most effective and valuable supervisory training jobs we have ever done on organization problems, labor costs, and the like."

Another suggestion which came from several men with long experience in this work was that all jobs, or at least a large list, should be rated for one factor before proceeding to the next factor.

LOCAL WAGE SURVEY: After all the jobs have been evaluated, indexed, and coded for easy reference, the actual wages of the operators in the shop should be plotted against the point values obtained from the rating, and an average wage curve drawn through these points.

TABULATION FOR REVIEW: As a further check on the consistency of the rating, the jobs should be arranged in the order of increasing point values. List the jobs in this order down the left side of a tabulation form, and the various factors of the plan across the top. Then tabulate the points for each job under the corresponding characteristic. This makes it comparatively easy to see discrepancies, both between jobs for a given factor, and between factors for the various jobs. Points which seem out of line in the local wage survey may be accounted for or corrected by reference to this tabulation.

OUTSIDE SURVEY: Most companies are interested in paying wages commensurate with the average of the surrounding community. Naturally some form of wage survey is essential for obtaining this information. For several years, some organizations, such as the National Metal Trades Association, have conducted wage surveys through their member companies. These surveys consisted of a list of job names listed vertically along the left side of the paper and a series of 5c. wage ranges listed across the top. In the corresponding squares under these headings were shown the number of employees on a certain job receiving that particular hourly rate. These surveys are of very little practical use, however, because each job shows such a wide variation in rates with no indication as to reasons.

The type of survey conducted by NEMA, where jobs are indicated by descriptions and grades, is an immense improvement, but still nothing is known about the relative efficiency of the different workers or the different plants; it is not known whether the rate reported is the base rate or the total take-home with bonuses included; and nothing is known about possible intangible advantages offered at certain companies to offset a rate that would otherwise be lower than average.

Probably the most satisfactory procedure, though of course somewhat more costly, is for an experienced analyst to make personal interviews at outside plants. He should be able to discover differences in hours worked, relative efficiency, continuity of employment, various privileges, etc. A relatively few anchor points (anywhere from 10 to 75) obtained by this method and rated according to a particular plan, will give a very satisfactory wage curve representing the general level of outside wages. Obviously, when such interviews once have been made, and these specific jobs identified, future reviews need only to get the up-to-date money rates for those same jobs.

This wage curve may vary from a straight line depending upon the method used in arbitrarily setting the point values. Obviously, the law of diminishing returns must have its effect. If it has been recognized in the establishment of the point values, the resulting wage curve will tend toward a straight line. If the points have been set up on equal increments of values for equal increments of difficulty, the resulting wage curve will probably reflect the law of diminishing returns by taking a form somewhat similar to a parabola.

ADJUSTING THE RATES THAT ARE OUT OF LINE: With the jobs point-rated, and the wage curve established, there is still the problem of making wage adjustments. Of course, no employee will object to having his rate adjusted upward. But those whose rates are too high present a more difficult problem. There are several methods of handling the situation, which follow:

(1) Make the proper adjustment and hope that too much dissatisfaction will not develop.

(2) Transfer the operator to a higher rated job where his actual rate would be in line.

(3) Make no changes as long as the present personnel is on the job.

(4) Pass over that particular operator when any general wage raise is made.

(5) Give the correct rate to any new operator on that job.

Cost of Installation

One installation covering about 1000 employees with wages and salaries ranging up to $5000 per year, was reported to have cost about 0.5 per cent of the payroll.

One steel company made the following comment, "We did not intend that the work we were doing should necessarily result in a saving in payroll, but rather looking toward a more equitable and justifiable distribution of that payroll to the organization affected." They reported the following data: 7000 men affected by the ratings and 3000 different jobs rated; 2000 men received increases in total daily earnings; 1200 men received no change; 3800 men received slightly decreased total daily earnings. Of the four plants involved in this change plant No. 1 had an increased payroll of 0.5 per cent; plant No. 2 had a decreased payroll of 4 per cent; plant No. 3 had a decreased payroll of 5.5 per cent; plant No. 4 had a decreased payroll of 10 per cent; and the total company payroll was decreased 4.6 per cent. The plan has been in effect since 1931, and the three reasons given for

its success are fairness, impartiality, and adequate maintenance.

A large refining company, where out of 12,000 employees 7000 were covered by a job rating plan, reported a total cost of installation of 0.5 per cent of the company's payroll, and cost for continued maintenance of less than 0.1 per cent of the company's payroll. The greatest portion of the installation cost was required in getting the facts about the jobs, in other words, the definitions. As this is essential in any rating system, this cost should not be charged to any particular type of plan. The cost of installation and maintenance increases as the plan is extended up the scale of salaries, and it was the opinion at this refining company that salaries of about $10,000 per year represented the economical limit for job evaluation. In this particular installation, covering 7000 jobs, eight analysts are required to maintain the system on the hourly jobs and some salaried jobs; but they are continually extending their work in the salaried jobs.

Another refining company reported 1000 different jobs rated, covering 4000 employees. Six analysts are required there for maintenance of the system.

Administering the Wage Curve

Several methods were reported on the administration of the wages resulting from the survey. One steel company established 25 fixed rates for the classified jobs. No individual operator was assigned a fixed personal rate. The foreman reported daily the operators who worked on each job, and their pay was calculated from that time report. The jobs on which each operator worked seemed to be under the control of the foreman. This method makes no provision for reward for long service, or for any other intangible value, other than by transfer to a higher rated job.

Another method in common use is the establishment of a range of rates for a given class or labor grade, with no overlapping of the rates from one grade to the other. Other methods let the maximum of one grade be about equal to the midpoint of the next higher grade. The extent of these ranges seems to vary from about 10 per cent of the midpoint to about 50 per cent; however, the most common practice seems to be between 20 and 30 per cent of the midpoint value of the job. The IMS plan provides for infinite flexibility, not being confined to specific grades; and, at any point value provides for a 20 per cent range in the rate of the individual job. This provides for lower starting rates, and for raises on the basis of merit and service.

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SOME rating plans attempt to measure experience by the total learning time for the job. Certain other plans, however, attempt to give a clear cut basis for measuring experience by considering such factors as dexterity, precision, versatility, and period of adaption to a new company or new type of work.

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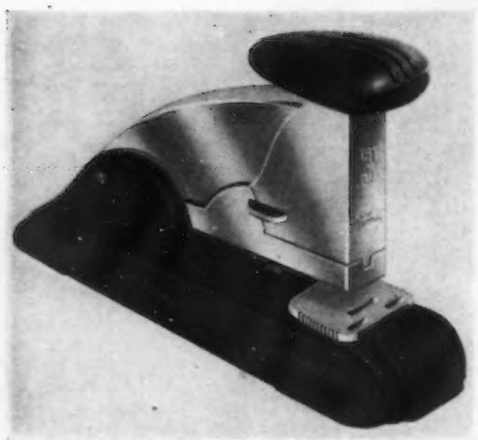
Validity of the Plan

The proof of any plan, however, is in the ability of different people at different times to obtain reasonably consistent values for a given job. The author recently devised a description for a first-class arc welder, with some special supervisory responsibilities. This job was rated by several experienced men, and a rate of $1.11 per hr. was obtained from the IMS plan. A class of 59 students in a personnel class at Purdue rated this same job on a quiz, and the median of all their grades was $1.11, and the median of the best two-thirds of the class was $1.10. An official grading by NEMA of a similar grade of welder, but with less supervisory responsibilities, and based on an NEMA survey last year in the Chicago area gave $1.09. The same group of experienced men who arrived at $1.11 from the IMS plan, obtained $1.13 from the NEMA plan. A class of 125 students in a general management course at Purdue, who had absolutely no experience in grading jobs, found an average of $1.15 by the IMS plan in a classroom experiment in grading this job from slides. It might also be interesting to note here that experiments with the students on jobs ranging around 55c. per hr. and around 75c. per hr., gave equally close correlation, both with the NEMA plan and with the IMS plan.

There seems to be no doubt regarding the desirability of some good plan of job rating. Perhaps none of the plans thus far published will give perfect results. It would be desirable for all industries to work from the same plan so that interchange of wage data could be made with little or no difficulty. But for many reasons, many of them purely personal, it is not likely that any one plan will be universally adopted. Many different opinions are well justified regarding the various forms of presentation. There is one extremely important point, however, that the author would like to make and that is—that since the total number of points used in a plan is unimportant (it being only the percentage of distribution that really matters), it would be advisable that no matter how many factors are to be considered, there should be consistent work toward the establishment of the total points for each job on a uniform basis so that easy interchange of the ultimate wage rates can be effected. At any rate, it is imperative to make *good* descriptions of our jobs, and adopt and *use* some good rating plan and thereby improve the general level of industrial relations.



NO. 3 Parrot Swingline Speed Fastener, produced largely from stampings.

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STAMPINGS BUILD A

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By HERBERT CHASE

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STARTING from scratch in the depths of the depression some seven years ago, the Parrot Speed Fastener Corp., Long Island City, N. Y., has built up a thriving business in office supplies and equipment made largely from metal stampings. This growth is a reflection of good business management, as well as a high order of engineering skill including a knowledge of high production methods and ability to apply them in product fabrication. The market is highly competitive, and to gain a fair share of the total business the products are designed for superiority along certain lines and produced with such economy as to be sold at a low price.

Today, the business includes several products made in large quantities, but it was built up chiefly around so called Swingline Speed Fasteners, which are small machines to staple papers together.

Objectives of the new design include not only elimination of common troubles, such as jamming staples in the machine, but rapid and simple loading, better appearance, less chance for abuse in service and lower cost. Staples are furnished in strips fastened together by adhesive.

In the magazine of the unit they straddle a rail along which they are fed into the driving position. The palm operated ram drives the points of the staple through the papers and against the anvil which does the clinching.

Accompanying illustrations give a good idea of the general design and of the parts employed in one model the No. 3, which retails at $3.50, this being one of several models manufactured in large quantities. To attain the low price and yet have a product which will function with no trouble it was necessary, first, to design the parts to close dimensional limits and harden sections subject to wear, and, second, to produce them, largely by stamping, in tools so well made as to hold the close dimensions required. Although a stamped base was considered, it was found possible to hold closer dimensions and secure better appearance by using a die cast base with molded rubber feet, except for the smallest model which uses an injection molded plastic base without separate feet.

Most models have soft molded rubber knobs mounted on top of the rams. Two coil springs are used and there is one roller produced from brass rod in a screw machine and several pins sheared from rod in a punch press, but practically all other parts are stamped. The use of screws, which might work loose, is avoided. One assembly is made by spot welding and several by riveting and by force-fit pins.

All stampings and press tools are made in the plant. Stampings that require hardening after forming are sent out to be nitrided by Chapmanizing and special finish work is done by outside specialists also.

One drilling and one milling operation are done on the base, but practically all other operations are done on Bliss presses, some of which are used for other jobs besides stamping. Another exception is the grinding of one end of the hardened steel driver to fit the staple, which is carried out on a surface grinder 100 pieces at a time.

Two flat steel springs are blanked from blued spring stock, one of them being punched and formed slightly and both having one end notched to fit mating parts in the assembly. Nearly all other parts are stamped from cold rolled steel which, in most instances, is purchased in strips slit from sheet stock in 8-ft. lengths or in coil form. All of the stampings for the No. 3 size fastener are shown in an accompanying illustration and other illustrations show certain of the more unusual press dies. A majority of the parts require only simple punching, blanking and bending operations, for which details need not be given here. Certain of the more precise or unusual operations will be described however.

Among the more important stampings and one which must be held within close dimensions is the magazine. Limits on the inside width of this piece are ±0.001 in. This part requires more operations than any other piece, is one of few which involve drawing and is one of two parts requiring swaging. Results of the seven punch press operations are shown in an illustration of the parts after successive steps, of which the first is blanking and piercing from 0.050-in. cold rolled stock, done in a 4N Bliss press at the rate of about 15,000 blanks a day. In the second operation, the blank is formed, which involves drawing at one end and bending the sides at right angles to the base. This leaves a flash at the forward edges, which is trimmed in the third operation, but some extra metal remains, to be displaced in the swaging, which follows an annealing. Swaging is required because the drawing necessarily leaves rounded corners. These must be made square to act as suitable guides for the driver, and also to accommodate the track and to help guide the staples as they approach the driver.

Forming is done at the rate of 8000 pieces per 8-hr. day, blanks being fed and formed pieces removed by hand.

New Business

To permit of swaging, the metal of the side wall is tapered and the base is bent correspondingly. Swaging is done with the piece in inverted position with the sloping edge resting against a shoulder on a floating male portion of the lower die. The upper half of the die, which contains the ejector, is hollow and of such width as to fit the outside

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STAMPINGS for fastener magazine, showing the successive steps in production. These include: Piercing and blanking, drawing, trimming, swaging, notching and two additional piercing operations.

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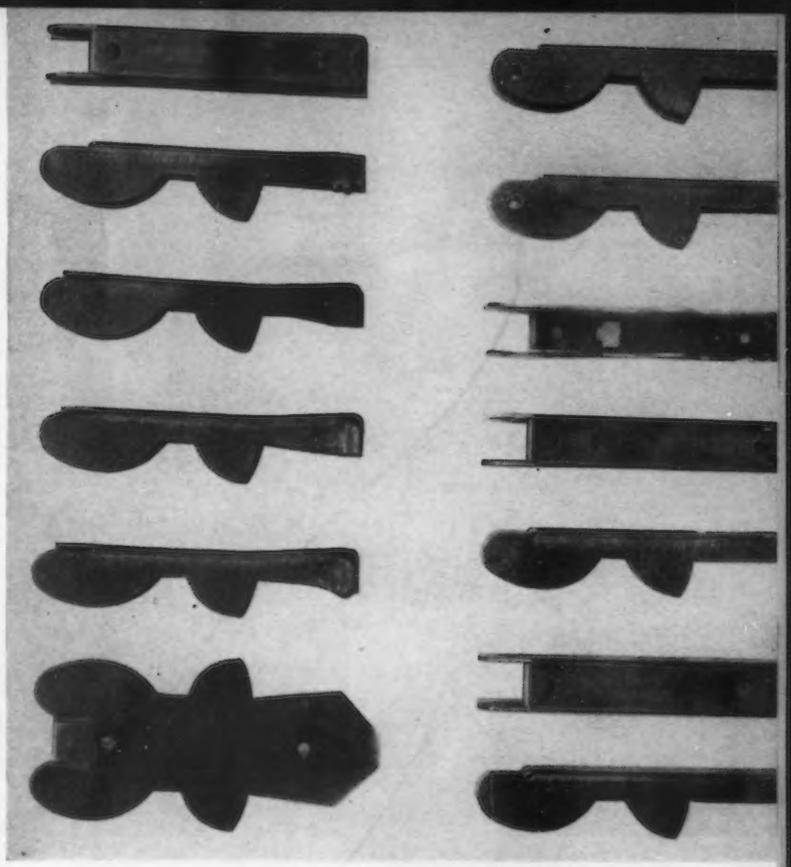
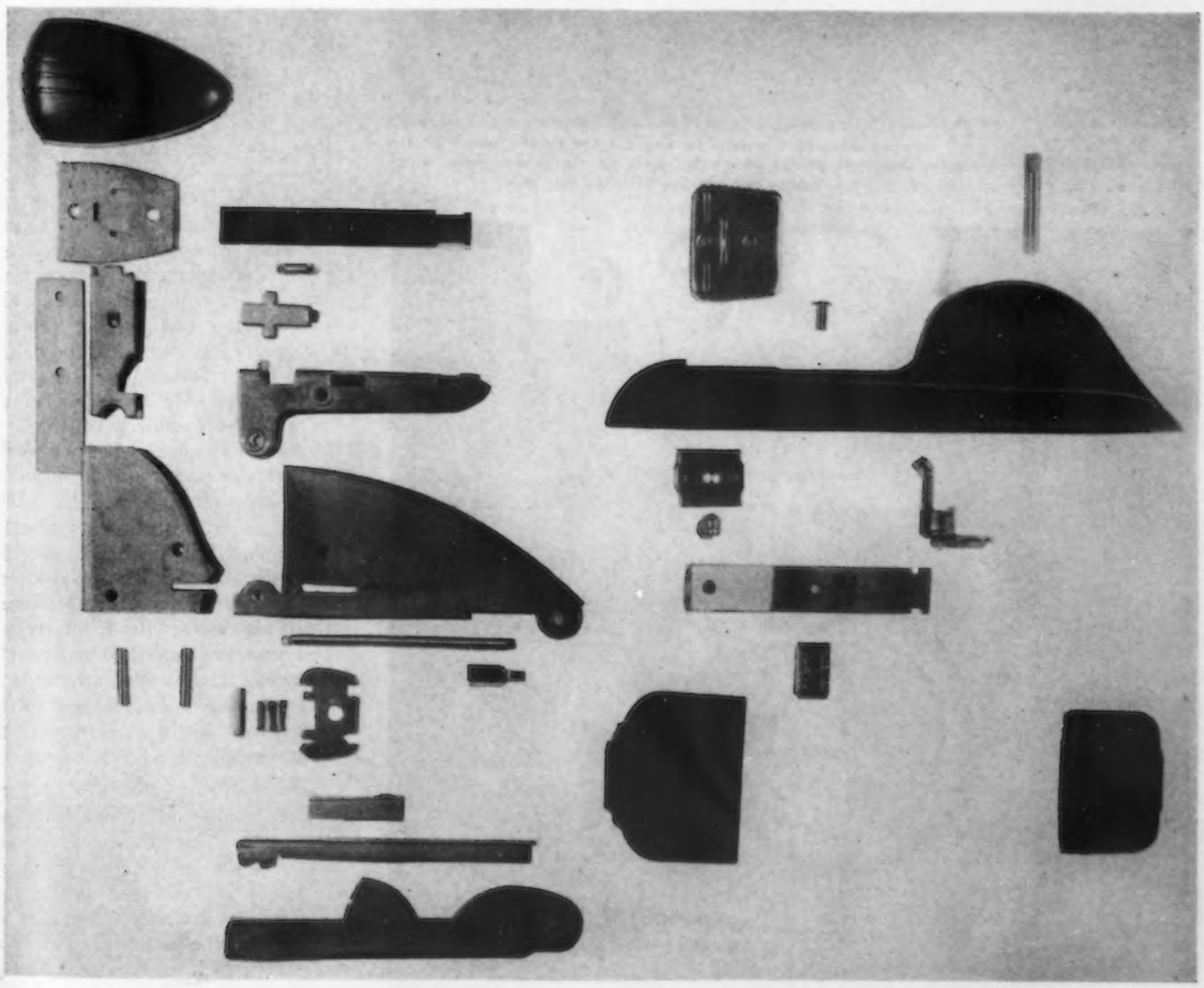
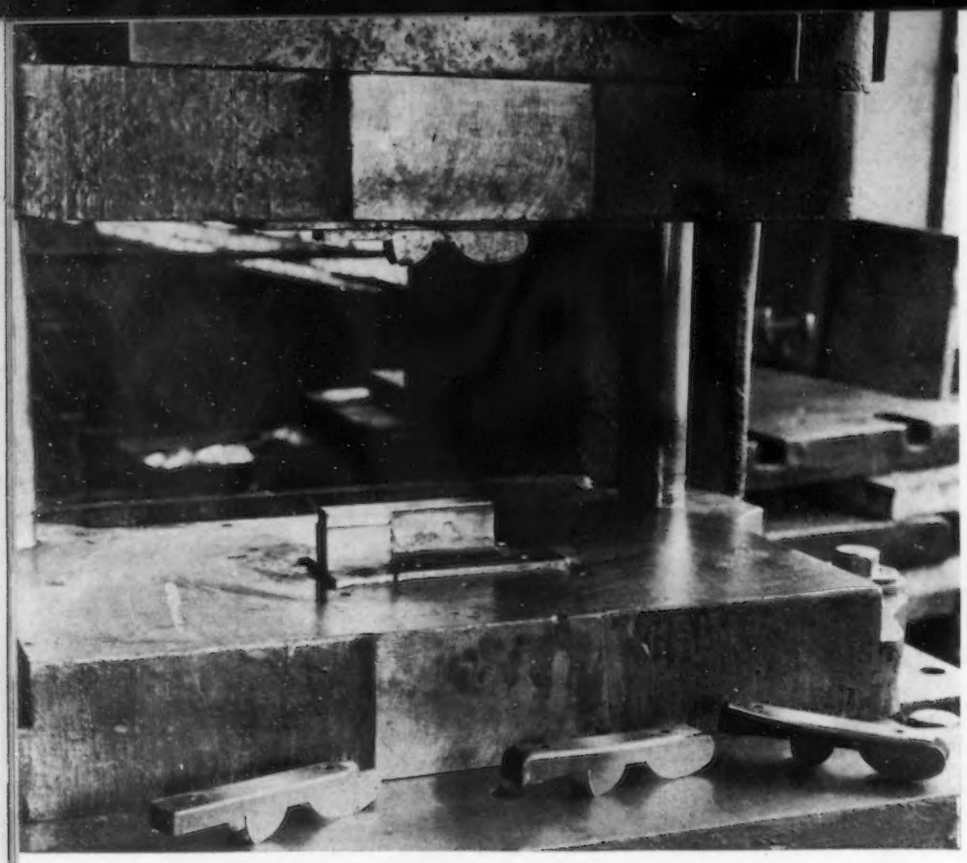


BELOW—All parts entering into the production of the No. 3 fastener are shown here. The base is die cast, but nearly all other parts are stampings, except for the soft rubber feet and knob.





VIEW of the swaging dies, showing the drawn magazine about to be inserted. The punch, on the bottom half, is allowed to float and has a shoulder against which the edges of the front part of the piece rest.

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DIE used for punching a square hole and slot straight through each of two sides of a case. The slug cut out by the punch on the upper side acts as the punch for piercing the second hole, which thus comes dead in line with the first hole.

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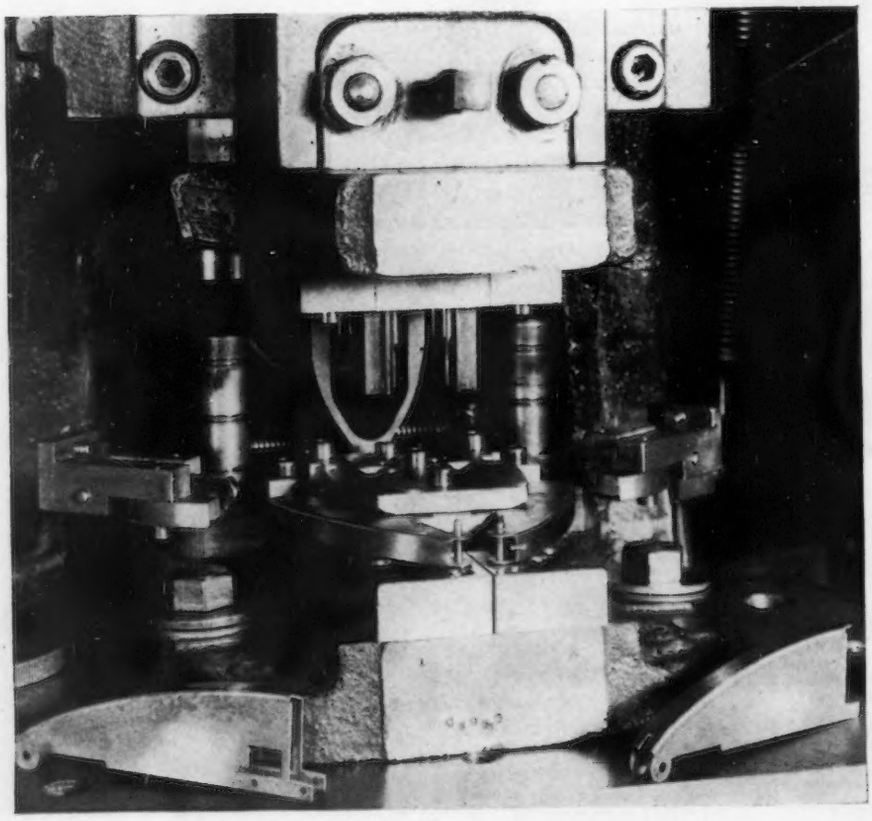


of the formed stamping closely. It also fits closely against the formed end. As the piece is struck, the metal from the beveled sides can only flow upward and in so doing fills out the radius left in forming, making a square corner—both inside and outside. Any excess metal forms a flash in a clearance space left in the ejector block and is subsequently removed on a belt sander. Originally, the punch was rigidly fastened, but was subject to breakage after short runs, whereas the floating punch runs without breakage until worn out, after perhaps 15,000 blows. Swaging is done in a 21½ geared Bliss press (55-ton) at the rate of about 5000 pieces per 8-hr. day. Following removal of the flash, two piercing and one notching operations are performed and the open (rear) end of the piece is bent upward. The piece is then tumbled to remove burrs before being sent out for hardening and plating.

Wherever possible on parts to be plated, sheared edges are arranged to come with the burrs outward so that they will be removed in the polishing operation before plating.

Largest among the stampings and the only other large part which involves drawing is called the case, this being the hinged backbone portion which houses the long coil spring and other operating parts. This case is blanked in a 4N press from 0.050 x 4⅜-in. cold rolled stock, the strip being fed through the press twice to economize in stock, as the blank is approximately triangular. Piercing and blanking are done at the rate of 15,000 per 8-hr. day and forming (on a No. 21½ geared press) at about half this rate. In the forming die, the punch is in the lower half and a rubber block operates the ejector. When formed, the piece has an arched back and two parallel side faces which include the hinge holes from which the piece is located in subsequent operations. In the blank, these hinge holes are 0.015 in. undersize and are subsequently shaved to size in a two-position die which also shaves the front edges and the contour around the two holes. The stampings are handled two at a time for trimming one face and then are turned over in the same die for trimming the other face.

In producing the less expensive smaller model, operations corresponding to those just described are carried out in a die in which both faces of the piece are trimmed and a square hole and slot are punched in each without turning the piece over. In this die set, the punch pierces one face and

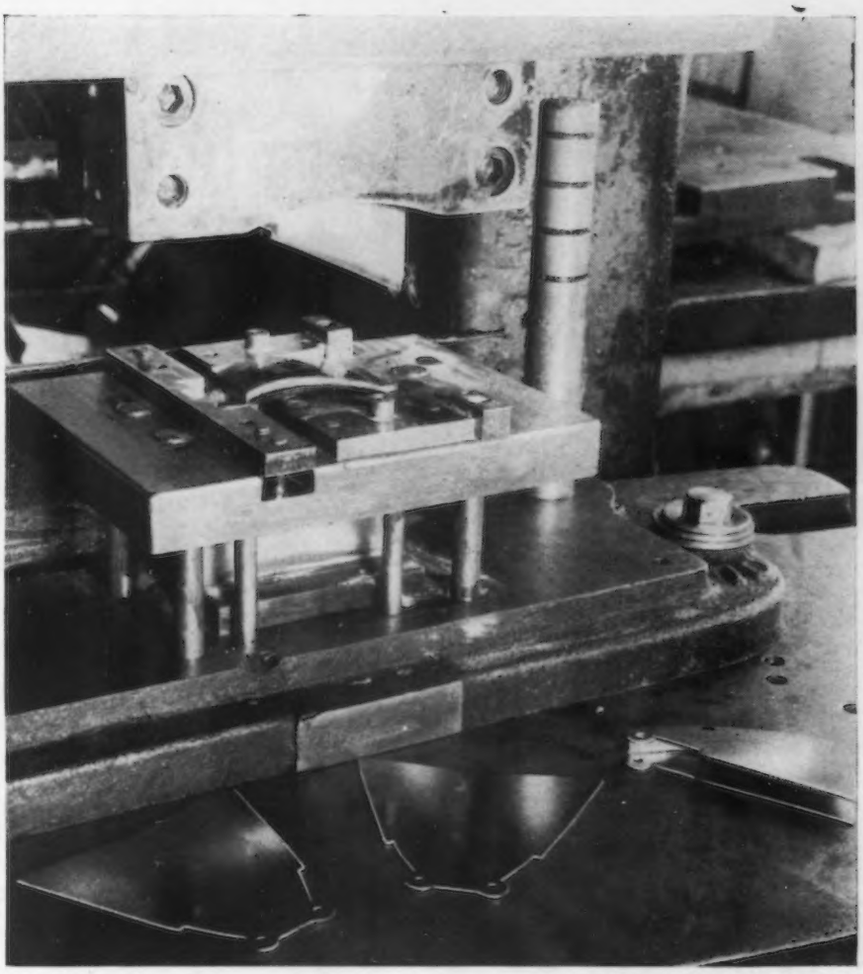
pushes the slug cut from the hole ahead of it through the second face. This innovation not only saves time but insures having the holes in exact alinement.

Where some parts are to be fastened by riveting to mating parts, as for example, in fastening the ram blade to the channel shaped portion of the ram, one part is struck on the back with an extrusion punch which flows metal into a hole in the die below, forming an integral extruded rivet. As this operation is done at the same time as blanking or piercing, it costs very litle and the integral rivets form a secure fastening, making it unnecessary to purchase or handle separate rivets. On the ram part this operation is done in a progressive die which also forms some offset stops, blanks the piece, and finally forms it into the required channel shape. Several other small progressive dies are employed for producing certain of the other small parts.

The rail or magazine track (on which the staples are advanced by a spring) is a simple channel shape stamping but has to be held within close dimensions, as the end of the rail forms one side of the slot or raceway which guides the staple and the blade which drives it during the driving stroke. Operations on this rail include piercing and blanking, the latter forming projections at front and rear ends which fit into mating slots in the magazine. Next, the rail is formed to channel shape and the radius at the bend is then swedged to give a square corner at the front end. Finally, the front end is shaved to hold the dimension between the front end and the rear of the two front projections within ±0.001-in. limits.

Remaining operations on stampings are quite simple and follow conventional practice. Most of them are done on No. 18 presses and the number of pieces turned out range from 30,000 to 50,000 a day.

As stamping production requires many more dies than there are presses in the plant, parts which are finished are delivered to a stock room in tote boxes and, except for those sent outside for hardening and finishing, remain there until the full quota required in the assembly of a given run is on hand, when issue to the assembly department is made. The stock room also handles die castings, screw machine parts, and those molded plastic parts produced by outside suppliers. Rubber parts are molded in another department of the plant and are delivered to the store room until required in assembly.



CLOSEUP of die used in forming the case. Around the punch, which is in the upper half of the die, is a formed piece about to be ejected. The stripper is operated by a rubber pad.

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DIE used for shaving the front edge and contour around the hole of the case stamping after it is formed. Stampings are handled two at a time and are turned over after the first side is trimmed, so that the second side can be trimmed in similar fashion.

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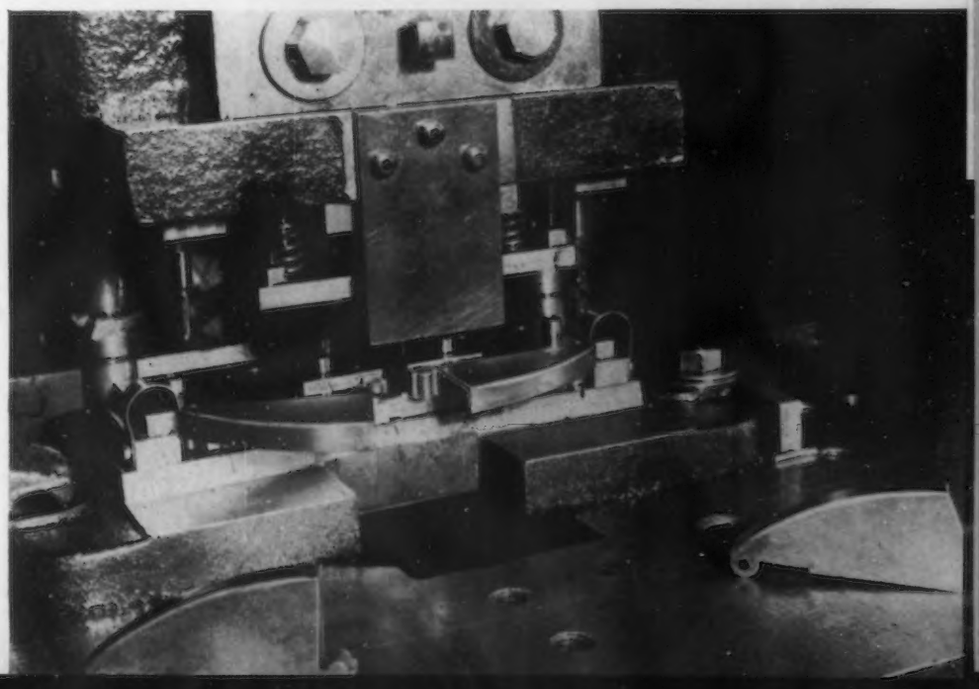

Weirton Opens 29-In.

By T. C. CAMPBELL
Pittsburgh Editor, The Iron Age

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IN rebuilding an existing 23-in. structural mill to provide for an entirely new 29-in. mill, so that additional and larger structural sections might be manufactured, the Weirton Steel Co., Weirton, W. Va., a subsidiary of National Steel Corp., took advantage of present strip mill construction technique.

The expansion program, which includes a new blooming mill, two complete trains of 29-in. structural mill, hot beds and auxiliary equipment, capable of rolling 50,000 tons per month, represents the latest design contributing toward low cost operation and maintenance as well as flexibility and quality production. This project is one of the first major structural mill installations since 1928.

Pre-formed sections, billets, or blooms coming from Weirton's 40-in. blooming mill are transferred while hot to the shear and cut to proper size, thence delivered to a table roller on a car which transports them to the furnace approach table. A pusher is provided so that either a single or double row of semi-finished steel can be pushed into the furnace, depending on the length of the steel.

The new continuous heating furnace built by Salem Engineering Co., Salem, Ohio, and capable of being fired by gas or oil, is of a triple-fired type similar to that used in the large continuous strip mill setups. Weirton has made provision for two additional heating furnaces at some future date. The furnace capacity is 45 tons an hour for cold steel and 60 tons an hour for hot charge. It will take care of maximum bloom sizes 16 x 15 x 180 in. Hearth dimensions are 60 ft. x 18 ft. 6 in., the furnace being of the gravity discharge type.

After being properly heated, the steel is pushed to the furnace delivery table, which is 72 in. wide in order to take care of smaller sections being rolled back from the blooming or breakdown mill which precedes the structural mill. Heavy bumpers at the table take up the shock occasioned by the drop of the steel from the hearth.

The blooming mill tables, manipulator, and blooming mill were constructed by Morgan Engineering Co., Alliance, Ohio, in accordance with latest design principles. The gearing for the front and back blooming mill tables is completely enclosed with an oil circulating system. Bearings are anti-friction and the two rolls on either side of the mill are driven by individual motors.

The manipulator on both sides of the mill is all steel construction throughout, with tilting fingers on both sides of the mill so that material can be manipulated at will by the operator. This equipment is electrically driven, with the mechanism on the pinion side of the mill, all gearing being enclosed and lubrication provided by a circulating system.

The blooming mill is a 35-in. two-high reversing mill, the rolls being 82 in. long. The blooming mill was developed as a breakdown for structural shapes but since it may also be used as a blooming mill for breaking down ingots, the housings are of the closed top type. Special provision has been made for the by-passing of the furnace in case the blooming mill is used for reducing ingots. The top roll is counterweight balanced and the spindles hydraulically balanced to accommodate roll changing, which is of the hydraulically operated type whereby two rolls can be removed from the mill at one time. This method facilitates roll changing and cuts down considerably the time involved.

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VIEW from delivery side of 35 in. two-high reversing blooming mill. The mill is used for breaking down pre-formed structural sections or billets but can also be used to break down ingots.

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Structural Mill

BILLET being delivered to furnace table from the new continuous heating furnace.

The mill screw-down is motor driven and designed so that changing of the guides is made accessible for crane lifts. This construction feature is necessary because of the closed housings.

Roll and spindle bearings are of the fabric water-lubricated type, filtered water being utilized. Spindles, including the intermediate and leading, are universal.

The pinion stand is entirely enclosed and provided with a single type circulating oil lubricating system. Bearings are babbitted shell design.

From the blooming mill, the semi-finished structural steel sections travel to the three-stand finishing train, which may be a combination of one of the following:

(1) Three 3-high stands of 23-in. mill rolls, all being operated from the pinion stand with one motor, with the finishing stand used as a two-high mill.

(2) Three stands of 29-in. mill rolls, stand one and two being three-high and the finishing stand two-high. These stands can be driven by either one motor for the three-high and one for the finishing stand, or, if necessary, the three stands can be mechanically connected and both motors synchronized and operated together. These features provide for flexibility of operation.

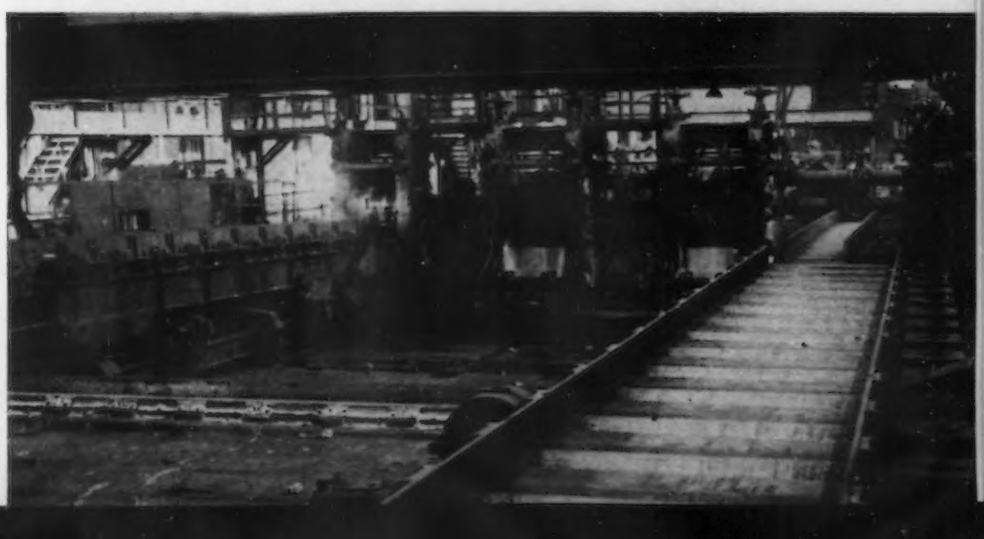
(3) Two stands of three-high, 29-in. mill, and one stand of two-high, universal mill, the latter for beam sections and, at possibly some future date, rail sections. These stands can be driven in the same manner as described under (2).

The 23-in. structural mill is the same equipment which existed previous to the new installation of the 29-in. mill. The 29-in. structural mill and duplicate stands were constructed by United Engineering & Foundry Co., Pittsburgh, and are equipped with fabric water lubricated bearings served by filtered water. In roll changing an entire stand is removed. Extra stands are kept in pits where they may be worked upon without interrupting production.

The finishing train of mills is served by four United traveling tilting tables, and two Mesta Machine Co. traveling tail tables, the latter on the entry side. The stationary tables and transfer on the delivery side were constructed by United and are movable and adjustable tables as to height for the finishing stand run-out table. Drives for all tables are entirely enclosed and have anti-friction bearings. Tables have been constructed to give the greatest amount of rigidity for the moving tables with a minimum amount of weight for the tilting tables. Air balances are provided on the tilting tables which are served by individual air compressors, and all table operations are motor driven. Tail chutes have been provided on each side of the mill for the long length small sections produced by the 23-in. structural mill.

A United No. 150 sliding frame hot saw has been provided for cropping ends of finished sections, as well as dividing them into hot bed lengths for shipment or warehouse stock or for cutting to size for shipment within limitation of mill production and capacity. This latter procedure is utilized to prevent holding up production on the mill by cutting sections to a length divisible by specified lengths

GENERAL view of new structural mill from delivery side of blooming mill showing traveling tail and tilting tables, pinion stand, three-high roughing and intermediate stands, and the finishing stand.



VIEW of hot bed. This bed is composed of three units which can operate as a whole or partial whole.

for shipment. Two motor operated gages are also provided.

The newly constructed hot beds measure 225 x 70 ft. over-all and consist of three beds which may be operated as a whole, as a partial whole, or as one long single bed. Three rows of 75 in. long bars can be handled at one time. The beds have a special synchronizing feature, both electrical and mechanical, provided for straight edges, turn-ups, and transfer dogs, so that in handling the material distortion will not occur. These arrangements, of course, are utilized when all three hot beds are being used as a single bed or as a partial whole.

Rotary Straighteners

Two rotary straighteners are provided at the end of the hot beds for a range of products, one having a 32-in. roll center and the other a 45-in. roll center. Both units have movable tables so that the entire machine can be located in and out of the operating line hydraulically as demand requires. This arrangement permits changing of rolls on one machine while the other one is in operation. This feature, as well as others mentioned, emphasize the flexibility of the mill and the time saving methods utilized in operations. A set of vertical rolls is provided for the entry and delivery ends of each machine. The four bottom rolls and the first top roll of the straighteners are motor driven, and the remaining three rolls are operated by friction. Gear reducing units are enclosed with a circulating oil lubricating system. Special provision has been made to handle the scale.

A sufficient area of transfers has been provided beyond the straightener for proper inspection, assorting, and handling of the finished product. Four sets of cradles have been provided for weighing and bundling of the steel

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scheduled for distinct outlets. Extreme flexibility in approaching shears, saws and gag presses has been provided by various transfers and tables.

The transfers are equipped with dog-ducking devices so that the operator can transport material at will. In addition to this feature, several transfers have double sets of dogs, so that the shapes may be moved either way.

Throughout the entire layout of the new mill it is at once noticeable that it has been designed to make possible a flow of operations unhampered by bottlenecks or prolonged holdups. Cat walks have been built at many strategic points to facilitate maintenance and provide for safety of workmen.

A warehouse, 110 x 528 ft., recently erected adjacent to the company's main office building, is included among the facilities of the structural mill.

New products in the structural mill include: H beams, 4 in.—13.8 lb. to and including 8 in.—37.7 lb.; wide flange beams, sections not exceeding 24 in. in depth and 9¼ in. in flange width; car and ship building channels, 3 in.—6.5 lb. to and including 13 in.—50 lb.; car center sills, all sections; car and ship building, bulb angles, 4 x 3½ in.—11.9 lb. to and including 10 x 3½ in.—34.7 lb.; rolled tees, 2⅜ x 2½ in.—5.1 lb. to and including 6½ x 6½ in.—19.8 lb.; tees—split from beams, within the range of beam sections; zees, 3 in.—6.7 lb. to and including 6 in.—34.6 lb.; sheet and Z pilings, all sections.

Standard I beams will be rolled in sizes from 3 in.—5.7 lb. to and including 24 in.—120 lb., and standard channels will be rolled from 3 in.—4.1 lb. to and including 18 in.—58 lb.

The following information covering some details on motor drives for various equipment in the blooming and structural mills is of interest because it represents a considerable number of improvements over some of the older type structural mills:

BLOOMING MILL TABLES: The two front and two rear feed rolls are separately driven by 25 hp. motors, 575 r.p.m.

MANIPULATOR: Electrically driven by four 100 hp. motors, 475 r.p.m. The fingers on either side of the mill are operated by two 75 hp. motors, 500 r.p.m.

BLOOMING MILL: Driven by a 4000 hp. motor, 50 to 100 r.p.m. Screwdowns are operated by two 100 hp. motors, 475 r.p.m.

STRUCTURAL MILL: Driven by a 3000 hp. motor, 70 to 140 r.p.m., which range gives the three-high stands great flexibility, depending on structural sections being rolled.

TWO-HIGH FINISHING STANDS: Driven separately by 2250 hp. motor, 65 to 130 r.p.m., or in parallel with the three-high stands.

Motors for the mill were supplied by General Electric Co. and Westinghouse Electric & Mfg. Co.

Eleven cranes are utilized throughout the entire operations of the blooming and structural mills, including the warehouse. One 50-ton crane is ahead of the blooming mills and a 75-ton crane serves the delivery side of the blooming mill and the structural mill. A 15-ton crane takes care of the hot bed while three 15-ton and one 10-ton cranes are utilized in the finishing department. The warehouse is served by two 10-ton cranes, while both the motor room and the roll shop are each equipped with a crane.

GENERAL appearance of the plugger gun.

CARRIAGE and pedestal of the plugger gun.

MUD GUN REDESIGNED

THE recent completion by William M. Bailey Co., Pittsburgh, of four modern blast furnace clay guns embodying the latest principles of design, are representative of the great strides mud gun manufacturers have made since blast furnace tapping holes were stopped or plugged up by hand about 35 years ago.

Some of the first guns in use were of the steam or air piston type, followed later by the double barrel gun, driven on the same principles. About 1928 the electric mud gun was developed by William M. Bailey, and since that time various changes and improvements have been made but the fundamentals of operations have been retained. The Bailey gun is built and sold under method patent No. 1,780,485 as well as a number of design patents.

The gun proper on the recently completed Bailey electric plunger clay guns is a combination screw and piston type, with a pressure of 600 lb. per sq. in. at the nozzle. The piston has a rotation of about a quarter turn which effectively reduces friction and keeps wear from occurring in one spot. The clay barrel has a capacity of 9.6 cu. ft. and holds more than sufficient clay to plug a tapping hole.

With the 600 lb. per sq. in. pressure at the nozzle, makers of this gun say that the operator can consistently plug a blast furnace tapping hole against full wind pressure under any and all normal conditions. It is estimated that the wind pressure amounts to about 20 lb. per sq. in., the ferrostatic pressure is about 25 lb. per sq. in., and the friction pressure is about 5 lb. per sq. in., so that a total of 50 lb. pressure is about all that is needed to get the clay into the hole. As is well known, the pressure in excess of this is utilized to permit a heavy compression of the clay as it goes into and fills up the hole.

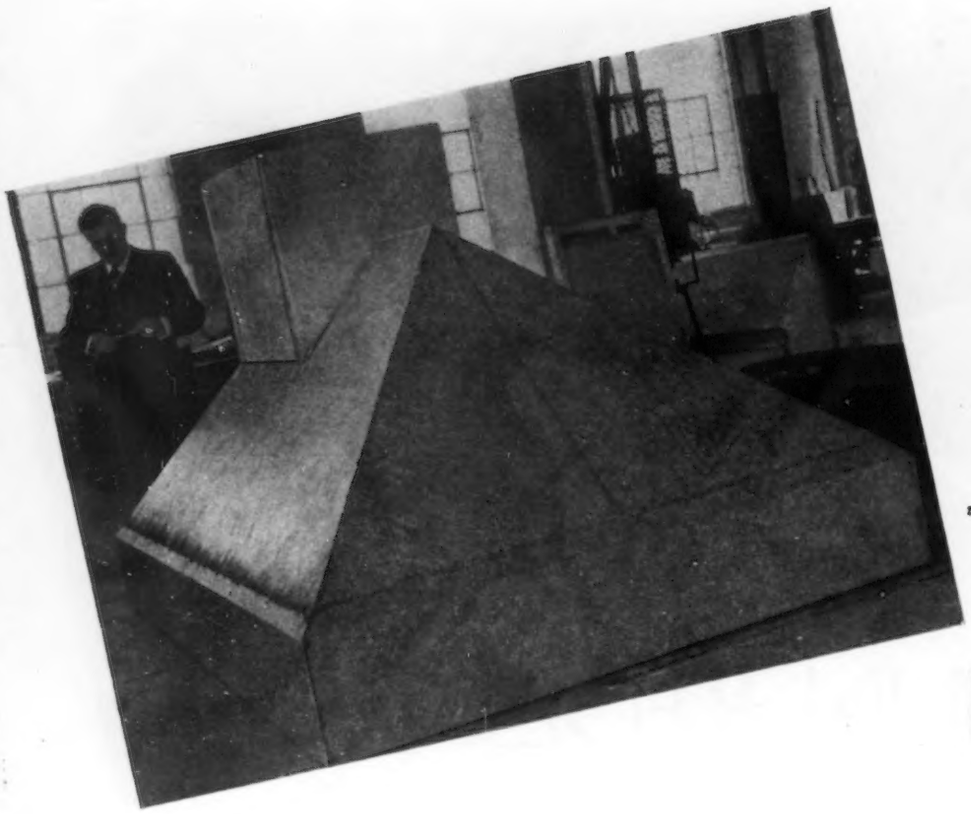
Added features on the new Bailey guns are three separate independent motor drives. One drive swings the gun and carriage around the pedestal until the carriage is automatically latched to the furnace hearth jacket and another drive puts the gun into and out of the blast furnace tapping hole, while the third motor drive furnishes the power for forcing the clay into the tapping hole.

The separate drive which puts the nose of the gun in and out of the blast furnace tapping hole provides a powerful and positive action, so that the gun moves in exactly the same path each time, thus preventing the nose missing the hole. Aside from being satisfactory from an operating standpoint, this action is, of course, an important safety feature, enabling remote control without fear of difficulties because of the nozzle missing the hole.

Two of the most recently completed guns are complete units with new type pedestals, while the other two which have been in service for about six months have been installed on existing pedestals. One of the complete units has already been installed at a blast furnace of one of the leading steel companies, and the second one is being installed by another steel company.

The maker of the gun claims that complete stopping of the blast furnace tapping hole can, under normal conditions, be accomplished in 40 to 45 sec. It is also said that with the relatively high pressure at the nozzle of the gun, a denser and harder plug results which insures long holes, a condition greatly desired by blast furnace men. It is to be noted here that in blast furnace terminology, the expression "long hole," means the same as a long plug, or, in other words, a condition whereby the tapping hole is plugged up completely from the inside furnace wall to the outside. Average depth of these holes runs about 6 ft. and, of course, goes in at a downward angle from the outside to the inside.

During the building of the last two mud guns, the carriages and pedestals were made of heavy welded and cast steel construction.

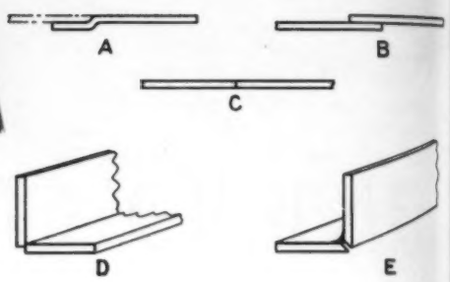


AT LEFT

FIG. 1. A stack made of galvanized steel, carbon arc welded.

BELOW

FIG. 2. Joints for carbon arc welding of galvanized steel. A—offset lap; B—straight lap; C—plain butt; D—outside corner; E—inside fillet.



WELDING GALVANIZED SHEETS

EXPERIENCE and investigation indicate clearly that welding galvanized steel affects only slightly the metal's corrosion resistant properties. For all practical purposes, the effect is nil.

Contrary to general belief, the zone from which the coating or galvanizing appears to have been removed by the heat of the arc, has its corrosion resistant reduced but very slightly. It is, of course, obvious that the heat of the arc will melt the zinc and that some of the zinc will go off in fumes. However, even this very small or narrow zone of what appears to be complete removal of zinc, is not subject to attack as ungalvanized steel would be.

Very excellent results are being obtained in the arc welding of galvanized sheet steel. The carbon arc process is used for all types of sheet metal work, including industrial heating equipment, baking and drying units, restaurant and kitchen equipment, trucks and racks, show cases and galvanized ventilating piping (See Fig. 1). The method is also used in repairing and strengthening shop equipment.

Straight Polarity Essential

For satisfactory results, the carbon arc welding of galvanized steel must be done with direct current. Only with direct current can uniformly straight polarity (which is absolutely essential in this work) be obtained. Straight polarity (where the current flows from the electrode to the work) provides an arc which is easy to strike and hold with the carbon. The uniform direction of current flow also makes it easy to move the arc along the seam being welded. The uniformly straight polarity of direct current also assures maximum welding speed and welds which are free from irregularities. Such welds are smooth and dense. Also important in welding thin galvanized sheet is accurate control of voltage and current to give the proper type and size of arc. The importance of accurate control may be appreciated from the fact that a difference of only approximately 6 amp. of current is required for best welding of 20 and 22-gage metal. The ability to make adjustments in increments as fine as desired frequently spells the difference between good and inferior welding of galvanized steel.

The filler metal is usually a long rod of 3/32 in. or 1/16 in. alloyed copper, such as Everdur, Herculoy, etc.

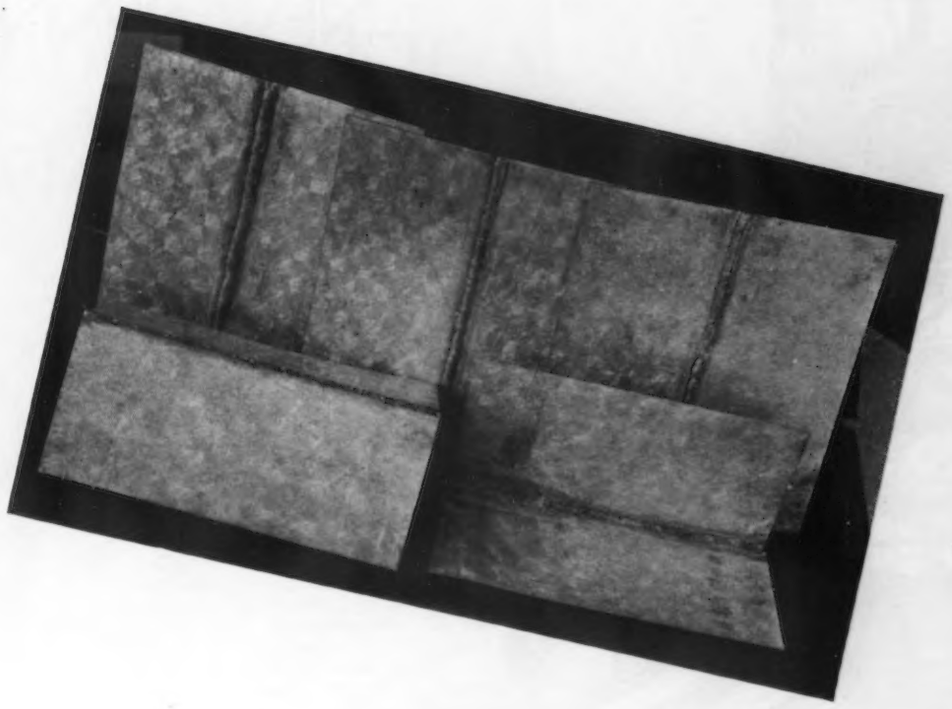
For the carbon arc welding of galvanized, a carbon of 5/32 in. diameter usually provides best results, although 3/16 in. carbons are entirely satisfactory on 16-gage metal. The current for the welding will vary from 50 amp. down to 20 amp. for the lighter gages.

In the actual technique of welding with the carbon arc, it has been found that one of the most important points

o o o

AT RIGHT

FIG. 3. Carbon arc welds in galvanized steel. (Photo courtesy Cleveland Sheet Metal & Engineering Co.)



o o o

S BY CARBON ARC

By E. W. P. SMITH

Consulting Engineer, Lincoln Electric Co., Cleveland.

o o o

to remember is that the carbon must have a long, thin taper. It is well to take a standard 5/32 in. carbon and grind it on an emery wheel so that it has a 4 or 5-in. taper down to a very small point. The carbon should be gripped in an electrode holder about 1½ in. from the point so that it will keep itself necked down and tapered.

In welding galvanized steel the filler metal is held on the joint at about a 10-deg. angle. The arc is struck with the carbon anywhere on the plate and held there until it becomes incandescent. This lights up the work and makes it possible to slide the carbon along the plate without actually establishing an arc, until the carbon reaches the end of the filler rod. This method also eliminates any false starts and possible damage to the filler metal. A very short arc is used. It is always played on the filler metal and not on the galvanized plate. The arc is so short that there is hardly any at all, being held in such a way that it is just kept from "going out." It is a simple matter to hold the arc and it can be advanced along the seam without difficulty. With a short arc and the correct heat, the resulting weld is extremely smooth, having the appearance of an automatic weld.

Offset Lap Joint

Experience has shown that certain types of joints are somewhat more readily welded by this process than others. The order of relative ease of welding of various joints is as follows: (1), offset lap joint; (2), lap joint; (3), butt joint; (4), outside corner joint; (5), inside fillet. These various joints are shown in Fig. 2, at *A*, *B*, *C*, *D* and *E* respectively.

The best joint is provided when the work is passed through a roll or a press brake and given an offset lap. With this type of joint, the weld metal flows practically like solder. Moreover, this type of joint has the great advantage on sheet metal work of acting as a stiffener and preventing warping.

On contract work, the extra operation of offsetting may be economically out of the question, and it may be necessary to use a straight lap, as at *B*, Fig. 2. This can be done very readily, it being necessary only to be sure to tack weld the edges together with the carbon arc every few inches before actually beginning to weld. This prevents opening of the seams.

Properly done, the carbon arc welding of galvanized sheet steel provides welds which have a tensile strength equal to the sheet steel and a resistance to corrosion which, for all practical purposes, is equal to galvanized sheet on both the top or weld side and the underneath side. Care should be used to keep the heat low enough so that the galvanizing is not lifted off, and also that the arc is always played on the filler metal.

NEW PENNSYLVANIA RAILROAD DUMPER HANDLES ONE CAR A MINUTE

COMPLETE view of Pennsylvania Railroad car dumper.

CAPABLE of dumping 60 cars an hour, the new Pennsylvania Railroad car dumper, designed, fabricated and erected by Heyl & Patterson, Inc., Pittsburgh, went into operation recently at Sandusky, Ohio. Over 1000 tons of structural steel were utilized in the building of the dumper, which is electrically controlled and operated and equipped with the most modern machinery for this type of material handling. Electrical equipment on this project was supplied by General Electric Co.

Outstanding features in the design of this dumping plant, said to be one of the largest and most efficient now in operation, include fast vessel loading and a minimum of degradation when dumping either run-of-mine or prepared coal.

This electrically-operated dumper is capable of lifting a coal car fully loaded, dumping it, and returning to the track within the space of one minute. Loaded cars are brought to the approach track of the dumper by means of electrically-operated pusher locomotives furnished by Atlas Car & Mfg. Co. A barney, operated by a cable which is run by two 500 hp. motors, takes the loaded coal car up the incline to the lift or cradle.

Motive power for the cradle consists of two 500-hp. motors utilized in hoisting the loaded car to the coal pan. The coal is then dumped into the pan and the empty car is returned to the track where it is pushed off the lift by an incoming loaded car. The empty cars are returned to the yard by means of a kick-back gravity track system.

The coal pan, which has a capacity of 125 tons, is equipped with a coal flow retarder which not only avoids degradation but permits rapid loading. This construction eliminates a drop and free run of coal in the pan and permits continuous loading of coal in the vessel during the intermittent dumping of cars.

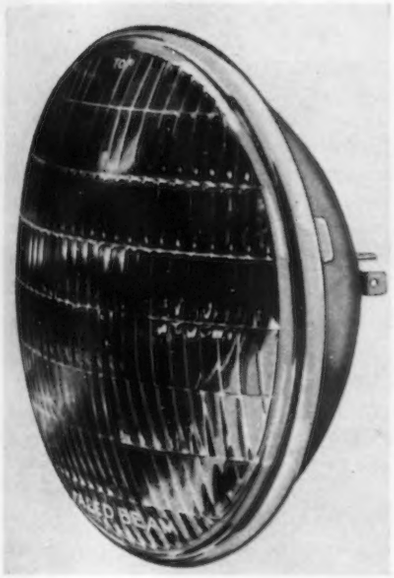
The pan also is constructed to assure a free run of sluggish coal, as well as proper handling of free running coal. In order to further keep degradation to a minimum, a discharge opening from the pan to the telescoping chute is exceptionally large, which enables it to pass a large cross section of coal. The pan mechanism is operated by two 200-hp. motors.

The telescoping chute, which is raised and lowered during the process of loading the vessel, has an unusually large cross section, the area at the bottom being 30 sq. ft. in order to pass a large mass of coal with minimum degradation. Chute operations are controlled by two 100-hp. motors.

A modern water sprinkling system is installed on the coal flow retarder which is capable of delivering a desired amount of water on the coal as it is dumped.

This car-a-minute coal dumper is the second one built for the Pennsylvania Railroad at Sandusky by Heyl & Patterson. The first was completed in 1925 and had a capacity of 40 cars an hour. In the first dumper the cradle hoist and haulage car were operated by steam engines. The new dumper brings the total number at Sandusky to three, and increases the Pennsylvania Railroad's facilities there by 60 per cent.

SEALED BEAM HEADLIGHTS READY FOR 1940 CARS



SEALED-BEAM HEADLAMP. This unit incorporates the lens, reflector and light source in a permanently sealed and assembled unit. This new form of headlamp which is being used on most 1940 cars provides the night-driver with more efficient lighting facilities than have heretofore been possible.

CLEVELAND—The new sealed beam automotive headlight system, combining the reflector, light source and lens in a single, permanently sealed unit, and embodying the product of three year's cooperative research and testing by the entire automobile and headlighting industry, with the collaboration of public authorities, is being announced today (Thursday) by the industry through the Automotive Safety Foundation.

It is expected that the new system will be employed on most 1940 model automobiles. The development is viewed as a landmark in safety engineering, although it is expected improvements will be incorporated as they are developed.

The sealed unit cannot be opened, and each element is adjusted at the factory in correct, unchangeable relationship to the others. The beam lamp is described by engineers as the most precise optical device turned out in mass production at the present time.

Will Help Driver

Outstanding advantages to the car driver are: 1. More light, properly distributed, is thrown on the road surface; 2. No dirt, dust or moisture can penetrate the sealed unit; 3. Longer-lived filaments make for infrequent replacement, but when a light does burn out the entire unit is replaced easily and economically (at automotive repair or service establishments); 4. Being sealed, the lamps should not lose more than a small fraction of their efficiency throughout life, and with replacement the car owner may anticipate new-car lighting efficiency as long as the vehicle is on the road; 5. Both for installation and use, the new device is as simple and fool-proof as enginering ingenuity has been able to make it. A screw driver is all that is needed to install and adjust the direction of a beam; 6. All makes of sealed beam lamps are wholly interchangeable.

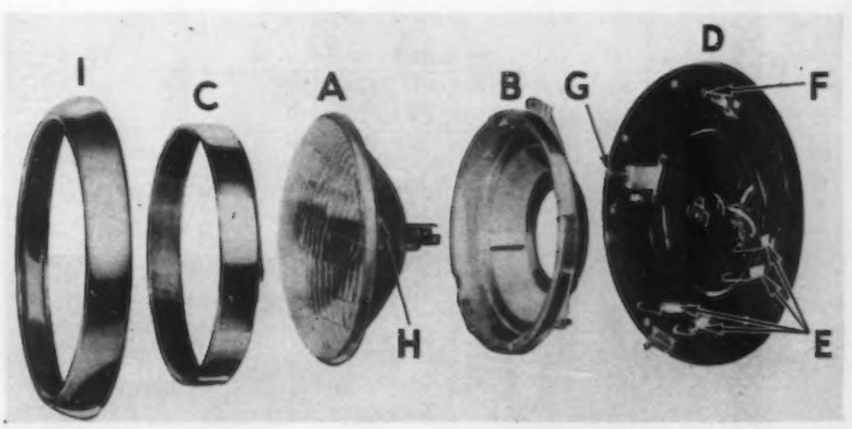
Followed Long Research

Back of the development occurred a long period of intensive study in which automobile manufacturers and lighting equipment makers cooperated.

To the advice and assistance of the American Association of Motor Vehicle Administrators the industry attributes in large measure the successful completion of the program.

The new lamps throw two light beams. The first, for universal use on lighted city and town streets and on the highway wherever there is movement of other vehicles, is known as the "Traffic Beam." This is virtually

(CONCLUDED ON PAGE 70)



THE "Sealed Beam" reflector unit (A) is held to a sub-body (B) by a retainer ring (C) and three screws which may be loosened for removal of the unit. The sub-body forms a ball and socket joint with a lamp housing (D) and is held to the housing by four coil springs (E), plus the vertical adjustment screw (F), and the horizontal adjustment screw (G). With this type of mounting the horizontal light beam adjustment can be made without disturbing the vertical light beam setting and vice versa. The reflector unit is provided with three locating lugs (H) which fit into corresponding slots in the sub-body. These lugs are so located that the reflector unit can only be mounted in one position.

THIS WEEK ON THE ASSEMBLY LINE

° ° °

By W. F. SHERMAN
Detroit Editor

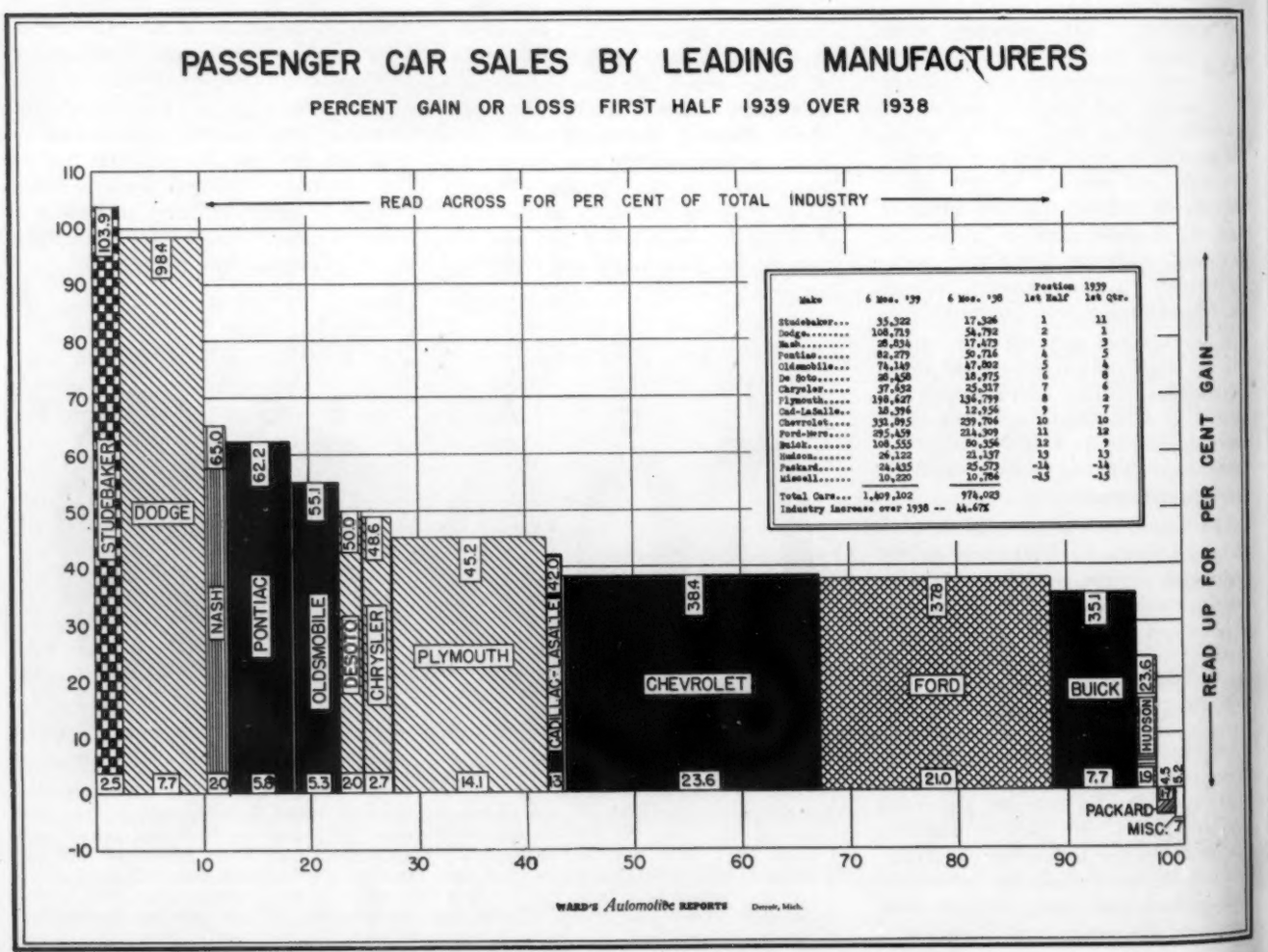
° ° °

. . . Independent producers expected to enjoy better business in 1940 . . . Studebaker leads industry in 1939 gains so far . . . Willys, closing $2,500,000 loan, has $4,000,000 in working capital . . . Automobile production passes low point with 12,955 units built in week.

DETROIT—Prospects for the independents in the automobile industry are definitely improved—psychologically if for no other reason. But the records speak for themselves in a few instances already, and new models which have been previewed will probably speak for themselves before many months have passed.

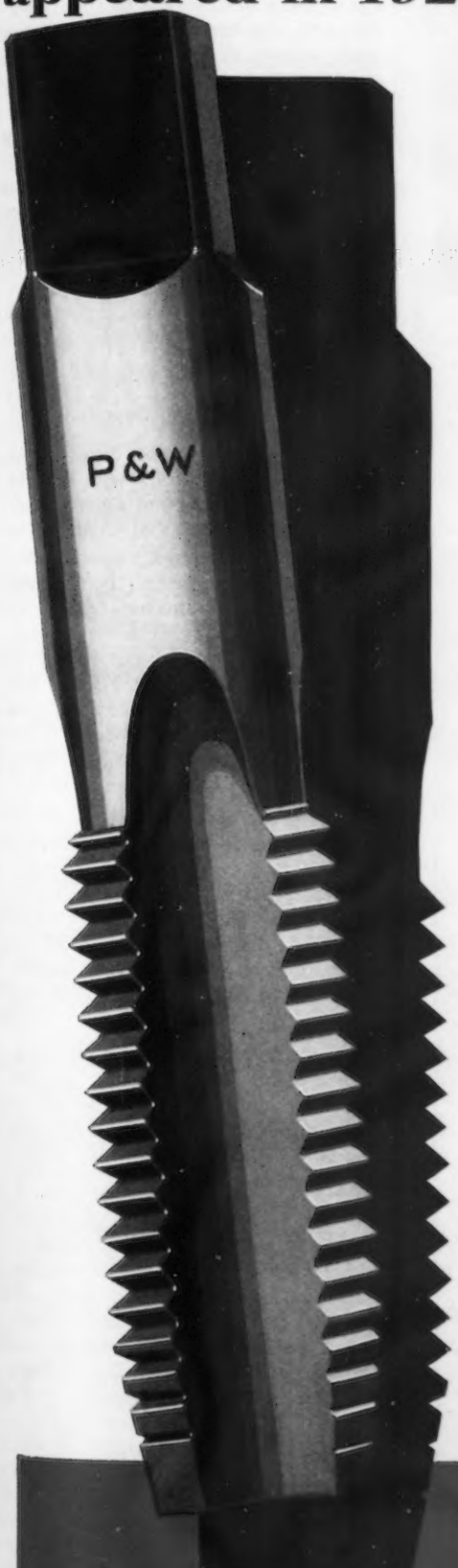
There is plenty of optimism attending the introduction of 1940 models, as mentioned last week in The Assembly Line. With business expected to be on the upswing during the fall, the record of two of the independents in the first half of 1939 stands out. Studebaker is the bellweather of the flock even though it only captured 2.5 per cent of the industry's total sales. Its gain over the first half of 1938 amounted to 103.9 per cent, as compiled by Ward's Automotive Reports and shown on the accompanying chart. Nash, representing 2 per cent of the industry's sales, showed itself to be third most active in the industry, gaining 65 per cent over its position early in 1938. Only Dodge, with 98.4 per cent gain, got into the upper crust division. Both of these independents, with good looking cars to offer next year and with greatly strengthened sales organizations, will continue the performance, it is anticipated.

The remaining three important independents, Hudson, Packard and Willys, were at the bottom of the list


PASSENGER CAR SALES BY LEADING MANUFACTURERS
PERCENT GAIN OR LOSS FIRST HALF 1939 OVER 1938
READ ACROSS FOR PER CENT OF TOTAL INDUSTRY
READ UP FOR PER CENT GAIN
STUDEBAKER 103.9 2.5
DODGE 98.4 7.7
NASH 65.0 2.0
PONTIAC 62.2 5.8
OLDSMOBILE 55.1 5.3
DESOTO 50.0 2.0
CHRYSLER 48.6 2.7
PLYMOUTH 45.2 14.1
CADILLAC-LASALLE 42.0 3.1
CHEVROLET 38.4 23.6
FORD 37.8 21.0
BUICK 35.1 7.7
HUDSON 23.6 1.9
PACKARD 4.5
MISC. 6.2
110 100 90 80 70 60 50 40 30 20 10 0 -10
10 20 30 40 50 60 70 80 90 100
WARD'S Automotive REPORTS Detroit, Mich.

Make	6 Mos. '39	6 Mos. '38	Position 1st Half	Position 1939 1st Qtr.
Studebaker	35,322	17,326	1	11
Dodge	108,719	54,792	2	1
Nash	28,834	17,473	3	3
Pontiac	82,279	50,716	4	5
Oldsmobile	74,149	47,802	5	4
De Soto	28,458	18,975	6	8
Chrysler	37,632	25,317	7	6
Plymouth	198,427	136,799	8	2
Cad-LaSalle	18,396	12,954	9	7
Chevrolet	532,895	239,704	10	10
Ford-Merc	395,459	214,309	11	12
Buick	108,555	80,356	12	9
Hudson	26,122	21,137	13	13
Packard	24,435	25,573	-14	-14
Miscell	10,220	10,784	-15	-15
Total Cars	1,409,302	974,023		
Industry Increase over 1938 --		44.67%		

This True Story about P&W Taps appeared in 1927



There were no * * * * in the letter to *Jimmy*

Recently we sent some taps to a prominent nut and bolt company in Detroit. It happened that the test of some of these taps against others was run at night. Whereupon our Detroit office received the following communication:

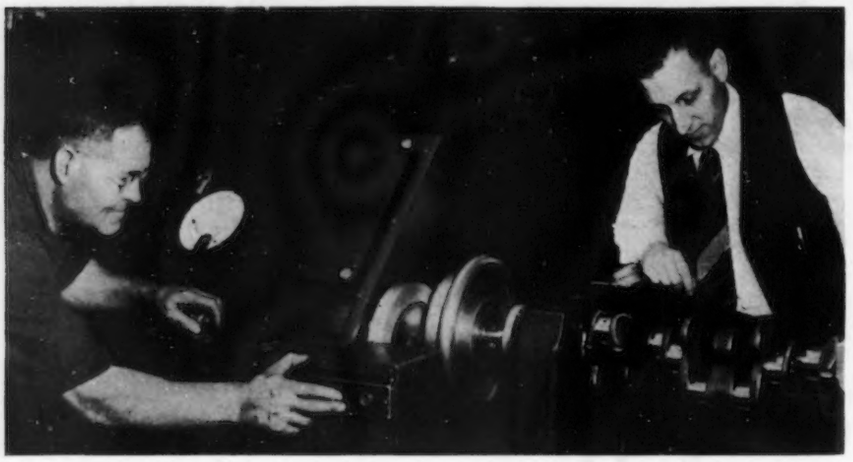
> "In testing out the special taps which you left with me, the results on one in particular is quite interesting. As witness, the following verbatim note our night operator left for Jimmy
>
> *'Jimmy:*
>
> *That tap that was in No. 6 run all those nuts out and I put it in No. 3 and d****d if it isn't still going to beat h***. If they'd order some taps like that they wouldn't have to get them by the arm loads. I broke about a half dozen of those other taps before midnight in No. 3. They're not worth a d*** — won't stand up.'*
>
> "I have this tap with a few of the nuts produced thereon on my desk which I will be glad to let you have to show your friends in Hartford."

Is it any wonder that the operator's enthusiasm sought emphatic language for expression?

Since then 12 more years of constant research and progress have contributed to P&W Tap quality and performance!

PRATT & WHITNEY

Division Niles-Bement-Pond Co., Hartford, Conn.



O. W. FRANKE, master mechanic (at the right) of the Plymouth Plant, Detroit, placed in operation the first unit of a dynetric balancer for crankshafts. In this precision test the crankshaft is rotated and the smallest vibration is amplified one million times when radio tubes amplify the current. Adjustment is made by four control knobs on the panel and the indicator shows the amount of unbalance in four different planes successively. Plymouth is first in the auto industry to adopt the dynetric balancer which has proved its value in the manufacture of aircraft engines.

this year (Willys in the miscellaneous group) but their respective cheering sections see a change for the better in the forthcoming year. Hudson has, it is generally agreed by those who got an advance peek, the best looking car it has ever put on the road; Packard has strengthened its line-up and offers improvements; and Willys is on better financial ground, with a high-powered organization of new leaders to help it along the path to prosperity. Lower prices on almost every new vehicle for 1940 will be a further inducement to higher sales totals.

The independents in this industry have had a hard course to follow, particularly during the depression when they seemed to have been singled out for many of the hardest blows. Paul G. Hoffman, president of Studebaker, brought this point out clearly last week when he recited a list of independent manufacturers who went out of business during the last 10 years. He included Auburn, Chandler-Cleveland, Durant, Gardner, Marmon, Peerless, Pierce-Arrow, Reo, Stearns, Stutz, Franklin Jordan, Locomobile, Kissel and other manufacturers of lesser importance.

Profits Drop Shortly

Hoffman declared that all of the automobile manufacturers who had survived have surmounted almost insurmountable obstacles. He pointed out that according to the Federal Trade Commission, net profits (before interest or Federal income taxes) declined sensationally. On the Chrysler car, net profit on sales per vehicle fell in those 10 years from $125 to $22; Cadillac from $174 to $25; Chevrolet passenger car from $59 to $29, and Ford from a profit of $29 a car in 1929 to a loss of $5 per car in 1937.

Among the independents the decline was even more marked. Studebaker's net profit per car fell from $83.32 in 1929 to $8.48 in 1937; Hudson's from $35.74 to $3.15; Packard's from $419.97 in 1929 to $23.83 in 1937, and Nash, which earned $160.67 per car in 1929, lost $8.36 on every delivery in 1937.

So much for the impact of depression on automobile profits. As Mr. Hoffman summed it up, "The over-all average net profit per car in the great year of 1937 was less than $30, a rather astounding fact."

Helped the Nation

Mr. Hoffman, who in four years has pulled Studebaker back from the brink of real bankruptcy, says: "There is one basic lesson to be learned from the fact that the automobile industry can be sold on a manufacturer's profit margin of $25 or $30 a car. This industry is a perfect example of what private enterprise can accomplish when given freedom of action. And the industry has been fortunately free during most of its existence. Year by year it has delivered exceptional

THE BULL OF THE WOODS — BY J. R. WILLIAMS

GO AHEAD, DRINK -- I'LL HOLD TH' HANDLE FER YOU!
NEVER MIND--I'M NO CRIPPLE -- I CAN HANDLE MY OWN HANDLES! TAKE CARE OF YOUR OWN BUSINESS -- I'LL TEND TO MINE
I THINK THAT UNGRATEFULNESS IS TH' BIGGEST REASON THAT WE NEVER CAN HAVE A PERFICK LIFE ON EARTH -- NO UTOPIA WITH PEOPLE HAVING THAT ATTITUDE!
NO, THAT'S NOT TH' MAIN REASON -- IT'S BECAUSE A LOT OF BIRDS THAT TREAT YOU WITH EXTREME KINDNESS ARE JUST PRIMIN' YOU FER A DIRTY TRICK -- AND IF YOU'RE FOXY ENOUGH TO SPOT THEM KIND YOU'VE GOT UTOPIA ENOUGH!
COPR. 1939 BY NEA SERVICE, INC. T. M. REG. U. S. PAT. OFF.
THE FACE WASHER
J.R.WILLIAMS 8-18

values and contributed much to individual and national welfare."

The automobile industry as a whole recognizes the very important part played by the independents and Hoffman took cognizance of that, but made no special plea for the independents. "We face all the problems of the automobile industry, plus those that apply particularly to the independents. Yet, instead of being dismayed we are brimful of confidence. . . . Here at Studebaker we are trying to prove that the American Way is a good way, and that it still works."

A new chapter in Willys-Overland history has been captioned and given a start with announcement of a loan of $2,500,000 from RFC. Stockholders voted last week to amend the company's certificate of incorporation to comply with a condition imposed by RFC. The amendment defers passage of voting rights to preferred stockholders until six quarterly dividends, dating from Aug. 15, 1944, have been passed. Under previous plans the preferred stockholders were to assume control after one more dividend was passed.

Company Now Restaffed

This little company has been almost completely restaffed in the last year, largely with former Chrysler executives. It has reported a good debt situation and about $4,000,000 of working capital. Its loan at 4 per cent is to be repaid in 60 monthly installments.

Automobile production last week reached what is probably the lowest level of the year, 12,955 units, according to Ward's Automotive Reports. The figure is approximately half that of the previous week (24,875) and of the corresponding week in the previous year (23,970). This figure is the lowest reached by the industry since the week of Nov. 18, 1933, when 10,655 cars and trucks were produced.

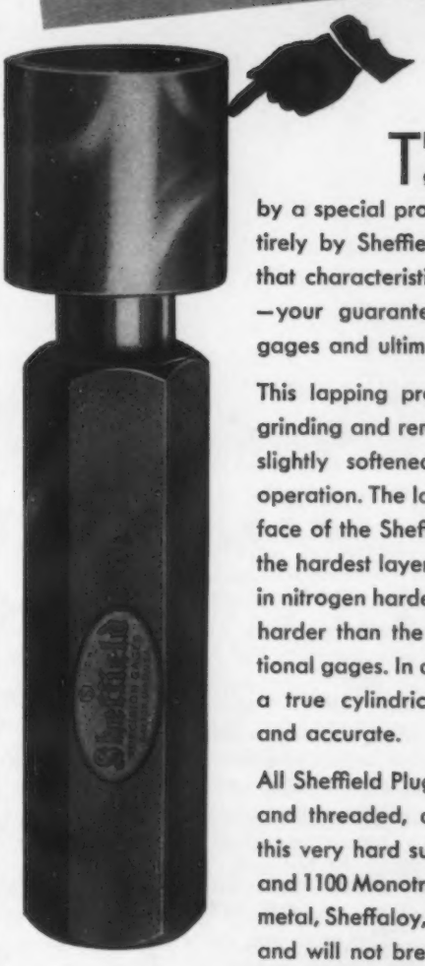
Last week's reduction in Ford operations was the principal reason for the decline. Ford produced only 2025 vehicles, mostly trucks or cars for export. Plymouth, only one of the Big Three on the upgrade, built 350 automobiles.

CIO Auto Union Wins Over Martin at Packard

DETROIT—Without any difficulty the UAW-CIO last week won an election victory over the UAW-AFL in the plants of the Packard Motor Car Co. Ballots were cast last Thursday under direction of the National Labor Relations Board and were tabulated Friday with the results available Saturday. The Packard vote fol-

(CONTINUED ON PAGE 59)

THAT HIGH-LIGHT PATTERN MEANS SHEFFIELD



THE SHEFFIELD plug gages are lapped by a special process developed entirely by Sheffield, which produces that characteristic high-light pattern—your guarantee of the finest in gages and ultimate gage economy.

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THIS WEEK IN WASHINGTON

. . . Some New Deal "insiders" seen hoping for failure of industry's efforts to bring recovery . . . Business to accept Treasury's bid to tax law discussions . . . Lagging PWA projects pushed for completion . . . War Resources Board holds first meeting.

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By L. W. MOFFETT
The Iron Age

o o o

WASHINGTON — Business is being urged once more to step up its tempo to pull the country out of a 10-year depression. It is being told to proceed with modernization and expansion of plant facilities and to absorb employment, thus relieving the enormous relief rolls. It is hoped it can do the trick, even if Government sponsors of the idea have a distinct political purpose in mind, fearing that unless the dreary spectacle of idle men, idle credit, and growing deficits will see them kicked out of office next year. It is also a move to bolster the inspired propoganda that business is on the spot, a device of the New Deal to shift from its own shoulders the blame for the failure to bring about recovery. Simply because Congress at last began to function as a legislative body rather than as a rubber stamp and in doing so has slapped down the New Deal nostrums, business is being told it has been given the go signal. Unless it does proceed under full power, it is insinuated, it will prove its incompetency and leave only the alternative of even greater government regimentation and socialism, already achieved to a remarkable degree. This is what some of the "inside" New Dealers want to see.

Reason for Cheer

Business has good reasons to be encouraged over the growing independence of Congress and the defeat of New Deal rabbit-in-the-hat measures. As in the case of former New Deal rebuffs either at the hands of Congress or the court, business was stimulated when the Administration's quack lend-spend bill was put on ice at the recent session of Congress. It was encouraged by elimination of the undistributed profits tax and the freezing of social security taxes. To its credit, the New Deal reluctantly approved the freezing of the latter taxes. But while the more conservative trend of Congress and its revolt against the Administration gave business encouragement, the country still has the New Deal, and the New Deal proposes to exert all its force to remain in power. It will revive its quack experiments, and its plans for further regimentation. Pious feints at petty economy to the contrary notwithstanding it will maintain its unbounded extravagance, deficits and taxes, conditions that mean there can be no substantial or enduring business recovery.

Talk of business cooperating, in the absence of any real attempt by the Government to reassure business, or to show any business sense has a hollow sound. Cooperation is a two-way affair and until the Administration does its part the get-together-and-push idea can't work. Until the Administration quits its unnecessary harrassment of business and gives it relief by way of sharply cutting government costs and bureaucratic control there is no reason to expect any great and sustained upsurge of business.

Costs Tremendous

The mounting costs of government are almost incredible. They are reflected in every direction. One outstanding example is the vast growth of Federal bureaus which a heretofore rubber stamp Congress has permitted under the Administration's guise of emergency.

The Federal civil payroll now stands at the highest point in the country's history. Federal employees in the civil branch, exclusive of those on WPA and PWA, in June of the present year totaled 925,260, enough people to make up about one-half of the population of Manhattan. In Washington there are 120,309 civilians on the Federal payroll. The peak number on the payroll during the World War in 1918 was 799,736. Indicative of the enormous swell in the Government payroll under the New Deal—one of whose cardinal planks was economy—is the fact that when it was ushered into power in March 4, 1933, there were 563,847 on the civil payroll. Hence, "planned economy" during less than seven years of the New Deal—it seems much longer—has seen 362,413 attached to the Federal payroll, and the groaning taxpayers milked accordingly. The June payroll was $128,127,191. This is at a rate of $1,537,426,292 a year, or $500,000,000 more than the total Federal expenses of $1,039,000,000 in 1916. In 1933 Federal expenses were $3,000,000,000. They have been upped to $9,000,000,000 a year. The number of civilians in the Federal payroll exceed by 384,000 the peak steel employment of 541,000 in 1937. In April of the latter year the steel payroll was $80,000,000 or at the rate of $960,000,000 for the year, $577,000,000 less than the present Federal civil payroll.

30c. for the Government

Representative George H. Bender, Republican of Ohio, has pointed out that in 1938 the entire income of the western half of the United States, from the Mississippi River to the Pacific Ocean, was $17,696,000,000, yet in the same year Federal, State and local governmental units of the nation spent $18,000,000,000. From every dollar earned by producers of the national wealth last year, 30c. went to maintain governmental units. One justification for high expenditures has been based on a so-called humanitarian appeal. Yet Mr. Bender pointed out that of every $6 expended by spending officers, only $1 went for relief.

"In the last seven years 67 new Federal bureaus, commissions, administrations, authorities, and agencies have been created to supervise the conduct of our business life," said Mr. Bender. "From shelling peanuts to producing steel, not an industry has been intentionally omitted by our governing agents."

The increase of employees, he stated, has not been limited to any small group of governmental departments.

"In the Department of Justice," he pointed out, "Attorney General Frank Murphy, who recently urged a $1,000,000,000 slash in the Government's payroll and a cut of 1,000,000 employees

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from Federal, State and local governmental units, the universal tendency to increase payrolls has maintained itself with equal force. In January, when Attorney General Murphy took his position, there were 8918 employees on his rolls. Today there are 9605, a 7.7 per cent increase."

Personnel Increasing

Despite the pretense that reorganization will cut government costs, estimated at a piddling total of some $20,000,000 larger appropriations are being made and the personnel is rising, widening further the gap between revenues and appropriations in the face of an unprecedented national debt of $40,000,000, a rising deficit, which in the past seven years aggregated $23,000,000,000. Unquestionably deficits for the current and subsequent fiscal years will add to this tremendous total.

"Under the guise of what some persons call 'liberalism', which, after all, as they would practice it, is a form of reactionism, personal rights are being interfered with and a powerful national government established," said Senator King, Democrat, of Utah.

The Senator said that there are reactionaries, calling themselves "liberals," who believe in State socialism, or a deadly paternalism, and who are laboring to change our form of government and convert the Republic into a socialistic state.

The New Deal clearly is irritated that capital won't come out of its shell, expand and modernize the industrial plant and absorb the unemployed. Apparently the Administration is oblivious or affects to be blind to the fact that its own policies have made capital extremely investment shy. Taxes threaten practically to confiscate earnings of business. Promises are made to business for tax relief and slashes in government costs only to be broken. Confidence is destroyed, recovery retarded and private employment impeded.

There is no question that moves in the direction of government-business cooperation frequently are made by able, and earnest men in the Government. The difficulty has been that the moves were halted by the higher-ups before they got anywhere. Coming from one of the business training and fairness of Acting Secretary of the Treasury Haines, widespread approval has been given his invitation of last week for industry, labor, commerce, banking, agriculture and professions to cooperate on a tax revision. But fingers will be crossed and tongues will be in cheeks until something actually constructive is done about it. And one necessary thing will be an exteremely sharp cut in government costs and regimentation. Window dressing in the way of a few shifts and dismissals of the many idlers on the payrolls won't do the trick.

NLRB Calls Four Elections For Workers of One Plant

WASHINGTON—Four separate collective bargaining elections for employees at the Vernon, Cal., plant of the Western Pipe & Steel Co. have been called by the National Labor Relations Board. Involved in the controversy are the CIO's Steel Workers Organizing Committee, acting for the Amalgamated Association of Iron, Steel & Tin Workers, and the AFL's International Brotherhood of Boilermakers, Iron Ship Builders, Welders and Helpers, International Association of Machinists, and the International Brotherhood of Electrical Workers.

Board Member Edwin S. Smith dissented, insisting that the plant exemplifies a typical mass production unit, that the industrial union constitutes the appropriate bargaining unit, and that there is no history of collective bargaining upon a craft basis in the plant.

The board also called an election for maintenance and production workers to vote for or against the SWOC at the plant of the Maryland Bolt & Nut Co., in Baltimore. The company was ordered to refuse recognition of the Maryland Bolt & Nut Employees Association, the board charging the association is "supported and assisted by the company" in violation of the Wagner Act.

Pig Iron Production in Bohemia Continues High

WASHINGTON—Production of pig iron in Bohemia and Moravia, German-controlled provinces in Czechoslovakia, aggregated 566,600 metric tons during the first six months of 1939, as contrasted with 697,900 tons in the whole of Czechoslovakia during the corresponding six months of 1938.

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Business to Accept Treasury Bid for Discussion of Taxes

WASHINGTON—Business and other interests are expected to give wide acceptance to the invitation extended them by Acting Secretary of the Treasury John W. Hanes for cooperation with the Treasury Department and a subcommittee of the House Committee on Ways and Means in a study of the Federal tax structure. Coming from Mr. Hanes, a practical business man, as well as a capable government official, with the approval of the subcommittee, the move is held to offer hope for real improvement in the tax laws and regulations rather than for tax reductions.

By reason of the enormous national debt and Treasury deficits it is held to be unlikely that tax relief in the way of slashes can be expected at this time. The cooperative study, however, is said to offer prospects of relief from the impact of Federal taxation by making it more equitable. Steel and other interests were invited by Mr. Hanes to participate in the study.

About three weeks ago Representative Jere Cooper, Democrat of Tennessee, suggested that business offer suggestions for revision of the tax at the next session. This is a reversal from the usual practice of a subcommittee making a report and then conducting hearings on it to get business views. It is an even wider departure from the earlier days of the New Deal which, without consultation from any source, whipped its own tax bill into shape, and jammed it through Congress. Mr. Hanes, while critical of business if he thinks his position is justified, has a sympathetic understanding of it and long has urged tax relief and in the face of early administration opposition advocated elimination of the onerous undistributed profits tax. This tax was struck out at the last session of Congress, due in no small part to the effort of Mr. Hanes.

The Hanes invitation for a cooperative study of the tax structure went out to prominent men in industry, banking, labor, commerce, agriculture, and the professions. Among individuals to whom it was directed were Edward R. Stettinius, Jr., chairman of the United States Steel Corp.; William S. Knudsen, president of the General Motors Corp.; Walter C. Teagle, chairman of the Standard Oil Co. of New Jersey; E. F. Williamson, president of the New York Central Railroad; Martin W. Clements, president of the Pennsylvania Railroad Co.; W. A. Harriman, president of the Union Pacific Railroad; William Green, president of the AFL and John L. Lewis, president of the CIO.

Included in organizations receiving an invitation were the National Association of Manufacturers, United States Chamber of Commerce, American Bankers Association, American Association of Railroads, American Bar Association, New York Stock Exchange, AFL, CIO, Automobile Manufacturers Association and various farm organizations.

In his letter, Mr. Hanes said that if individuals and representatives of organizations desired to have their views put before the Committee in full he would arrange private hearings prior to Nov. 1 before the Treasury staff now compiling a record of present public tax opinions.

"The chairman of this subcommittee, Mr. Jere Cooper, is desirous of having all pertinent material ready for presentation early in the next session of the Congress," said Mr. Hanes. "With the approval of his committee, I am writing to ask your cooperation in this effort to work out a tax revision program which will further improve the laws relating to individual and corporation taxes, the regulations derived therefrom and the administrative procedure in their collection."

New Industrial Market Handbook

WASHINGTON — An "Industrial Market Data Handbook" which the Commerce Department hopes will guide business in establishing new sales territories or reappraising old ones, was put on sale last week at $2.50 a copy. The handbook, the first of its kind to be published by the government, contains data on industrial production, employment, value of products, cost of material, fuel and power and output per wage-earner by counties and large cities for 1935. Orders can be placed with the Superintendent of Documents in Washington or with any district office of the Bureau of Foreign and Domestic Commerce located in principal cities.

Navy Supplies Bureau Awards More Contracts

WASHINGTON—The Navy Department's Bureau of Supplies and Accounts last week announced the award of contracts to these companies:

Revere Copper & Brass, Inc., Baltimore, naval rolled brass, $21,867; The Bullard Co., Bridgeport, Conn., boring mill, $11,631; Walworth Co., New York City, main steam line valves, $11,410; Landis Tool Co., Waynesboro, Pa., grinding machine, $7,499; Brown & Sharpe Co., Providence, R. I., milling machine, $5,371; International Minerals & Metals Corp., New York City, ingot copper, $6,294;

Pittsburgh Screw & Bolt Corp., Pittsburgh, bolts and nuts, $16,658; The Steel Improvement & Forge Co., Cleveland, steel alloy forgings, $51,175; Crucible Steel Co. of America, New York City, steel alloy forgings, $67,550; Bethlehem Steel Co., Bethlehem, Pa., steel alloy forgings, $609,000; and The Midvale Co., Nicetown, Pa., steel alloy forgings, $26,100.

War Resources Board Holds its First Meeting

WASHINGTON — Members of the newly appointed War Resources Board held its first meeting last week, exchanged pledges of cooperation with the Army and Navy high command, posed for news reel cameramen, but gave out only meager information concerning future plans.

Chairman Edward R. Stettinius, Jr., board chairman of United States Steel Corp., said after the meeting that the War Resources Board will consider primarily how the industrial and economic resources of the nation can best be prepared for the part to be played in the event of war.

Reich Gets $3,600,000 In Orders From Bulgaria

WASHINGTON—German manufacturers have received orders from Bulgaria for more than $3,600,000 worth of farm implements and machinery, according to reports from the commercial attaché in Berlin made public by the Commerce Department. The orders, the largest Bulgarian farm equipment orders ever placed in Germany, resulted from the new Bulgarian law providing for the modernization of agriculture.

Return on Investment in Steel Industry for Half Year Is 1.06%

RETURN on investment in the steel industry during the first half of 1939 was less than half the average return in the 10 years 1929-1938, and was only one-fifth as much as was earned in the 1919-1928 decade, according to the American Iron and Steel Institute.

The industry's earnings during the half-year just closed represented 1.06 per cent on capital investment, which compares with an average return of 2.4 per cent annually over the decade 1929-1938, and with 5.1 per cent in the 1919-1928 period.

Net earnings of the industry after all charges but before dividends aggregated $25,450,000 for the half year. After payment of approximately $19,000,000 in cash dividends on preferred stock obligations, the net was reduced to $6,450,000, a sum substantially less than the accumulated and still unpaid arrearages on the preferred stock of some of the companies in the iron and steel industry.

Approximately $55,000,000 in federal, state and local taxes were paid by the steel industry in the first half of this year. The total was 20 per cent larger than was paid in the corresponding period of 1938. The total amount of taxes paid so far this year is equivalent to a full month's pay for 390,000 employees. The tax bill amounted to $3.70 for each ton of products shipped to customers of the industry during the half year period.

More than $17,100,000 of the total tax bill represented taxes on payrolls under social security laws, and accounted for almost one-third of the total amount of taxes paid.

The total amount of dividends paid to the 519,000 stockholders of the industry represented 8 cents for each dollar going into the pay envelopes of wage earners employed by iron and steel producing companies.

Illinois Industrial Council To Meet At Green Lake, Wis.

CHICAGO—Illinois and Wisconsin industrial organizations will be represented at an industrial conference, sponsored by the Illinois Industrial Council, at Green Lake, Wis., Thursday and Friday, Aug. 24 and 25. James L. Donnelly, executive vice-president of the Illinois Manufacturers' Assn. is secretary-treasurer of the council.

The Illinois Industrial Council is composed of executive secretaries of industrial organizations in seventeen leading manufacturing centers of Illinois.

Gov. Julius P. Heil of Wisconsin will speak at the luncheon on the opening day. His subject will be: "Partners—Men and Management."

The legislative situation, industrial relations, public relations and problems of industry generally, will be discussed. The speakers include:

W. Homer Hartz, president, Morden Frog & Crossing Works, Chicago Heights, Ill., and president, Illinois Manufacturers' Association; B. C. Heacock, president, Caterpillar Tractor Co., Peoria, Ill.; T. S. Hammond, president, Whiting Corp., Harvey, Ill.; George R. Meyercord, president, Haskelite Mfg. Corp., Chicago; James D. Cunningham, president, Republic Flow Meters Co., Chicago; R. J. Aitchison, president, Fansteel Metallurgical Corp., North Chicago; C. S. Craigmile, vice-president, Belden Mfg. Co., Chicago; O. E. Mount, American Steel Foundries, Chicago; W. J. MacPherson, Public Service Company of Northern Illinois, Chicago; Burrus Dickinson, president, Eureka College, Eureka, Ill.; F. H. Clausen, president, Van Brunt Mfg. Co., Horicon, Wis., Homer D. Sayre, commissioner, National Metal Trades Association, Chicago; J. M. Barker, vice-president, Sears, Roebuck & Co., Chicago; James L. Donnelly, executive vice-president, Illinois Manufacturers' Association, Chicago, and Allan T. Gordon, legislative director, Illinois Manufacturers' Association, Springfield, Ill.

Contract Placed for New Self-Unloading Vessel

Boland & Cornelius, Inc., New York, has placed a contract with the Bethlehem Shipbuilding Co. for converting the former U. S. Collier *Jason* into a self-unloading vessel. The capacity of the reconstructed *Jason* will be approximately 10,000 gross tons of coal or an equivalent volume of coke, stone, gravel, or other bulk material. The hold is to be converted into a series of hoppers, provided with more than 80 gates through which the coal will flow to a pair of hold belt conveyors 42" wide and about 286' long, each of which has a capacity of 700 tons per hour.

At the bow end these hold conveyors made by the Robins Conveying Belt Co. transfer the coal by means of short transverse belt conveyors to the receiving end of a gigantic chain and bucket elevator running up through the deck and delivering to the lower end of a boom conveyor 54" wide and about 162' long; which handles 1400 to 1500 tons per hour of coal. This boom with its belt conveyor may be raised and lowered or swung out over either side of the boat, thus loading coal into existing hoppers, railway cars, or ground storage piles.

Welding Wire Output Declines 25% in 1938

PRODUCTION of steel welding wire in 1938 amounted to 117,395,000 lb., according to information received by the American Iron and Steel Institute. The 1938 output of welding wire was less than 25 per cent below 1937, when 155,310,000 lb. of weld[illegible] wire were made. This compares with a decline of 44 per cent between 1937 and 1938 in the total tonnage of steel ingots produced.

Between 1932 and 1938 the output of welding wire increased about twice as rapidly as the total production of steel, reflecting the wider use of the welding processes, particularly by manufacturers of products in which steel is used.

The amount of steel welding wire produced in 1938 was nearly five times the production in 1932, while steel ingot production last year was little more than double the tonnage produced in 1932.

Seven Month's Building Awards Up 30 Per Cent

DOLLAR volume of construction contracts awarded in 37 Eastern States in the first seven months of this year amounted to $1,999,247,000, an increase of 30 per cent over the comparable period of 1938, according to statistics compiled by F. W. Dodge Corp. Non-residential building in July, with a valuation of $88,501,000, was 22 per cent above July, 1938. Included in this total is $17,404,000 for manufacturing buildings, which represents a gain of 10 per cent over June and 80 per cent over July, 1938.

300 Exhibitors for 17th Chemical Exposition

MORE than 40 industries producing materials and equipment will display their latest products at the 17th Exposition of Chemical Industries for which nearly 300 exhibitors have already engaged space to occupy three floors of Grand Central Palace, New York. The exposition will be held Dec. 4-9.

Civil Rights of Industry Are Ignored, NAM Tells LaFollette

WASHINGTON—Declaring that business is harassed constantly by official invasion and disregard of the very civil rights to which the Senate sub-committee's name pays eloquent but meaningless lip service, the National Association of Manufacturers replied to attacks made on it by the La Follette Civil Liberties Committee in its third and next to last report on labor policies of employers' associations, made public on Monday. The Senate committee charged that the association had taken "deliberate action" to promote "organized disregard of the National Labor Relations Act." The committee also complained that, because corporations and not individuals constitute the membership of the organization, the political aspects of the organization's "propaganda" campaign is a "matter of serious concern."

"It is not necessary to refute further the La Follette-Thomas charges or statements in detail," said the association. "The record refuted them before the report was drawn.

Inference On Inference

"In their references to the National Industrial Council, the two Senators indulged in gross misinterpretation of facts and are guilty of pyramiding inference upon inference."

The association pointed out that the subcommittee's own record demonstrates that there is no central control of the policies of the various industrial organizations comprising the National Industrial Council. It was stated that it would be strange indeed if American business did not oppose measures which it believes, from experience, are inimical to industry and, hence, to the nation's welfare. The right to assemble and confer was declared to be one of the rights that manufacturers might expect Senators La Follette and Thomas not only to recognize but defend.

"As for the statements in the report that N.A.M. has either opposed certain legislation or urged its amendment; and that the association has engaged in a widespread publicity campaign, two brief comments will suffice," said the statement. "First, the right of any individual or group to criticize proposed or enacted legislation is one of the fundamental civil rights which the subcommittee asserts it is zealous to protect. Second, the N.A.M.'s public information program was designed to stimulate community goodwill; to foster a more general understanding of business as the source of jobs and livelihoods; to promote sound, national recovery, and to combat smear-campaigns against business.

Coercion By Unions Overlooked

"The investigation has been confined to alleged violations and abuses by employers. An impartial investigation would have been directed fearlessly at coercion of employees from any source, including certain types of labor organizations and labor leaders.

"The subcommittee condemns the association's expenditures as having some ulterior indirect political purposes. It make no reference whatever to direct political contributions and political activities of labor organizations."

The committee, which has recently been given $50,000 additional to continue its two-year probe of alleged industrial espionage and violations of civil liberties identified the corporations comprising the membership of the association; described what it called the association's "traditional opposition" toward collective bargaining principles and liberal legislation; and went into detail over N.A.M.'s extensive publicity and propaganda campaign." Although the committee reiterated its claim that it is not prepared to submit recommendations for remedial legislation, it said that its statement should not be construed to mean that it will not be prepared at some later date to offer recommendations after further study.

Supported By Steel Leaders

The report traced the history of the association and recalled that the management was reorganized in 1933 when it drew plans for initiating a new program of activities, and added:

"Charles R. Hook, president of the American Rolling Mill Co., started an underwriting campaign by securing contributions from T. M. Girdler, of the Republic Steel Corp.; Frank Purnell, of the Youngstown Sheet & Tube Co., and others. Participation in this underwriting was conditioned upon the reorganization of the association's management. The American Iron and Steel Institute and the Associated Industries of Cleveland advised their members to support the revised program of the National Association of Manufacturers."

Charging that anti-union employers and local employers' association executives used the association's material to combat the organization drive of unions in local industrial areas, particularly in the steel producing centers of Ohio where the committee said a labor organizational drive was under way, the report estimated that the association spent $790,000 a year for preparing and distributing "propaganda material." It conceded, however, that because local employers and employers' associations bore supplemental expenses and because radio, newspaper and outdoor advertisers contributed some free service, the total cost of the campaign is "not ascertainable."

ICC Revises Pig Iron Rates From Buffalo

WASHINGTON—The Interstate Commerce Commission has authorized interstate rates of not less than $3.88 per gross ton on pig iron, in minimum carloads of 56,000-lb. from Buffalo, and North Tonananda, N. Y., to Beacon and Matteawan, N. Y., without observing the long-and-short-hand provision. Rates to higher-rated intermediate points cannot be increased unless authorized by the commission and they will not apply over lines that are more than 53 per cent longer than the direct line. The relief was granted to permit the affected carriers to meet rates of the direct intrastate rail route. The latter rates were established originally to meet water competition on the state canal.

The commission also has modified a former order reducing rates on iron and steel products from Portsmouth, New Boston and Ironton, Ohio, and Ashland, Ky., and Huntington, W. Va., to Texas and Louisiana ports. Under the order these rates are not to be more than 7c. per 100-lb. higher than rates on iron and steel from Cincinnati to the same ports, but not less than 62c. per 100-lb.

By another order the commission granted long-and-short haul relief on rates on iron and steel products east of the Buffalo-Pittsburgh territory to Texas ports and Lake Charles, La. The carriers were authorized to establish lower rates with maintenance of the fixed differentials over the Buffalo-Pittsburgh rates.

Government Steel Orders $844,564

WASHINGTON — Government contracts for iron and steel products, as reported by the Labor Department's Public Contracts Division for the week ended Aug. 12, totaled $844,564. For the same period contracts for non-ferrous metals and alloys aggregated $54,153, and for machinery $993,995. Details follow:

Iron and Steel Products

Pittsburgh Screw & Bolt Corp., Pittsburgh, Navy S & A, bolts, steel	$11,892.35
Sterling Steel Casting Co., E. St. Louis, Ill., War, Engineer, carbon steel castings	16,159.00
Kutztown Foundry & Mch. Corp., Kutztown, Pa., Navy S & A, chairs	80,853.34
Albert & Davidson Pipe Corp., Brooklyn, N. Y., Panama Canal, welded steel pipe	13,537.80
Florence Pipe Foundry & Machine Co., Philadelphia, Florence, N. J., D. C. Government, cast iron water pipe	79,144.00
Pacific Coast Engineering Co., Oakland, Cal., War, Engineer, pontoon pipe	19,180.00
Bethlehem Steel Co., Bethlehem, Pa., Navy S & A, steel, rivet, bar	19,881.21
Union Drawn Steel Division, Republic Steel Corp., Cleveland, War, Ordnance, steel bar	22,939.17
Joseph T. Ryerson & Son, Inc., Chicago, Navy S & A, steel, plate sheets	377,400.00
American Rolling Mill Co., Middletown, Ohio, War, Ordnance, strip steel	84,280.19
Mine Safety Appliances Co., Pittsburgh, Navy S & A, tools	14,687.96
National Twist Drill & Tool Co., Detroit, Navy S & A, drills, carbon	29,487.06
Harnischfeger Corp., Milwaukee, Procurement, shovels	10,500.00
Republic Steel Corp., Chicago, War, Ordnance, miscellaneous steel	33,509.09
Peco Mfg. Corp., Philadelphia, War, Ordnance, eyebolt lifting plugs	20,028.88
Bliss & Laughlin, Inc., Harvey, Ill., War, Ordnance, manganese steel	11,084.77

Non-Ferrous Metals and Alloys

Aluminum Co. of America, Massena, N. Y., and New Kensington, Pa., Navy Purchasing Office, aluminum alloy	$14,120.96
International Nickel Co., Inc., New York City, Huntington, W. Va., Navy S & A, nickel, copper, alloy	40,032.44

Machinery

Davey Compressor Co., Kent, Ohio, Farm Security, air compressor	$18,176.00
Niles-Bement-Pond Co., Pratt & Whitney Division, Hartford, Conn., War, Ordnance, die sinking machines	11,385.00
Niles-Bement-Pond Co., Pratt & Whitney Division, Hartford, Conn., War, Ordnance, die sinking and contour milling machine	11,384.79
Rockford Machine Tool Co., Rockford, Ill., War, Ordnance, horizontal shapers	36,639.00
Davenport Machine Tool Co., Inc., Rochester, N. Y., War, Ordnance, screw machines	19,716.50
McKiernan-Terry Corp., Dover, N. J., War, Ordnance, staking machines	10,321.36
W. E. Shipley Machinery Co., Philadelphia, War, Ordnance, chucking grinders	20,120.00
W. E. Shipley Machinery Co., Philadelphia, War, Ordnance, grinders	22,421.25
E. L. Essley Machinery Co., Chicago, War, Ordnance, boring mill	21,853.00
Pratt & Whitney Division Niles-Bement-Pond Co., Hartford, Conn., War, Ordnance, drilling and reaming machine	14,660.00
Royal Typewriter Co., Brooklyn, N. Y., Hartford, Conn., War, Medical Sect., typewriters	10,922.50
Worthington Pump & Machinery Corp., Harrison, N. J., Navy S & A, pumps	652,800.00
Worthington Pump & Machinery Corp., Harrison, N. J., War, Engineer, pumping units	27,916.00
Caterpillar Tractor Co., Peoria, Ill., Interior, crawler tractor	27,948.00
Electric Boat Co., Groton, Conn., Navy S & A, mufflers	70,960.70
Massachusetts Gear & Tool Co., Woburn, Mass., War, Ordnance, gears	16,771.00

Japan Displaces Soviet as Chief U. S. Machinery Buyer

WASHINGTON — Exports of metal working machinery continued to rise during the first six months of 1939, reaching the all-time value of $55,685,450, as compared with $51,557,933 for the corresponding period of 1938. The Machinery Division of the Department of Commerce reported that Japan, the chief purchaser, replaced the Soviet Union, which was the most important market for United States metal working machinery in 1938. Shipments to Japan increased from $13,237,230 in the first six months of 1938 to $14,723,809 in the same period of 1939. Exports to Manchuria showed an even greater rise, from $237,690 in 1938 to $1,486,786 in 1939. Together, Japan and Manchuria took almost 30 per cent of United States exports of metal working machinery in the period under review, or about 15 per cent of the total United States production.

Exports to the United Kingdom rose sharply from $8,134,495 in the first six months of 1938 to $12,267,511 in the first half of 1939. The United Kingdom by the end of 1939 may again be the outstanding market for this equipment, the department said, noting that May and June shipments to the United Kingdom were greater than to Japan.

Metal working machinery exports to the Soviet Union dropped from $16,077,369 in the first half of 1938 to $9,776,201 in the first six months of 1939. The 1938 shipments to Russia set a record high which may not be equaled for some time. Last year Germany, previously the chief supplier of machinery to Russia, was unable to make deliveries of machinery wanted by the Russians, with the result that American sales rose to record heights. However, there is now some indication that Germany is again in a position to supply this market, and, in fact, several large Russian orders have recently gone to German firms, the Department said.

U. S. Tin Plate Shipment Is Admitted to Spain

WASHINGTON — Although imports of machinery, farm equipment and automobiles have thus far been denied applicants from the United States since hostilities ceased in Spain, in one specific instance tin plate imports were sanctioned as an urgently needed semi-manufacture. Only other imports approved have been basic raw materials, foodstuffs and other acutely needed semi-manufactures. The Department of Commerce reports that the Spanish government is maintaining a system of exchange control which compels the prospective importer to apply to the authorities for permission to import, which if granted, is followed automatically by provision for the allocation of exchange funds for payments.

Oil's Growing Use On Ships May Reduce Coal Prices

WASHINGTON — The coal industry of the United Kingdom has been so adversely affected by the increasing use of oil by diesel ships that it may be necessary to decrease bunker prices if coal is to maintain its present diminished share of the marine market. According to reports reaching the Commerce Department's Transportation Division a high efficiency steam engine can probably better the efficiency and economy of the diesel engine on certain routes, but that on longer routes the oil engine has definite advantages. Statistics compiled by Lloyds show that the percentage of the total gross world tonnage depending entirely upon coal has decreased from 88.84 per cent in 1914 to 44.67 per cent in 1939.

H. D. Hudson's Oshkosh Plant Being Modernized

MILWAUKEE—The H. D. Hudson Mfg. Co., Oshkosh, Wis., plant is being modernized under supervision of Capt. H. A. Thorndike, new general manager. Modernization will include installation of new concrete floors; modern precision machinery for manufacture of water well equipment and general well supplies; removal of the foundry to make room for larger assembly and shipping room facilities; enlargement of the machine shop area; new electric motors for each machine to eliminate overhead belts, pulleys and shafts; new tool room; a 50-foot stockroom.

J. A. Farrell Denies Allies Paid High Prices for Our Steel in Wartime . . .

o o o

Ex-Head of U. S. Steel Says 70% Sold Below $80 a Ton

JAMES A. FARRELL, a director of U. S. Steel Corp., denies reports that the Allies paid high prices for American steel in the wartime in a letter to the New York *Times*. Mr. Farrell served as president of U. S. Steel for 21 years, retiring from that position early in 1932. The text of the letter follows:

"I have read with some surprise the statement by Jules S. Bache on the question of governmental debts made in an interview with the press on his arrival from Europe in which he is quoted as saying, 'England does not owe us any money. We sold her steel at $285 a ton and we do not want that.'

"As chairman during the war of the Committee on Steel Distribution for the Steel Industry, in cooperation with the War Industries Board, I recall the prices charged the Allied governments for orders placed with the United States mills were approximately as follows: Shell steel bars, $63 a ton; plates and shapes, $59; ordinary bars, $53; forging billets, up to $80.

"The above covered upward of 70 per cent of the tonnage sold; special qualities for ordnance purposes were relative according to specification. At that time the American industry was paying Great Britain $1400 per ton for pig tin from the Straits Settlement and $400 to $500 per ton for ferromanganese produced from East Indian ores.

"If Mr. Bache is correctly reported, it is regrettable that the public should be led astray on a question of such importance by any exaggerated statement as to prices charged Allies for steel."

JAMES A. FARRELL.

New York, Aug. 16, 1939.

Record Shows Prices Were Set by U. S. Government in 1917

SUBSTANTIATION of Mr. Farrell's statements regarding World War steel prices is found in a report published by THE IRON AGE on Sept. 27, 1917, as follows:

"WASHINGTON, Sept. 25—President Wilson yesterday gave his formal approval to a scale of prices to govern the sale of iron ore, coke, pig iron, steel bars and plates and shapes to the Government, the Allies and the American public.

"The iron and steel schedule was as follows: Iron ore at lower lake ports, $5.05 per gross ton; coke at Connellsville, $6 per net ton; pig iron, $33 per gross ton; steel bars (Pittsburgh and Chicago), $2.90 per 100 lb.; shapes, $3, and plates $3.25."

The dispatch quoted the following from the official announcement:

"It was stipulated, first, that there should be no reduction in the present rate of wages; second, that the prices named should be made to the public and to the Allies, as well as to the Government, and, third, that the steel men exert every effort necessary to keep up the production to the maximum of the past, so long as the war lasts.

"A spirit of cooperation was manifested by the steel men and no doubt is entertained that every effort will be made to bring the production as nearly as possible up to the extraordinary demands resulting from the war."

Wartime issues of THE IRON AGE show that in August, 1917, sales of ferromanganese were reported at $400 a ton by THE IRON AGE's Philadelphia correspondent. In March, 1918, it is reported that Straits tin sold as high as $1700 a ton. At the same time English exporters were asking $250 a ton, c.i.f., for ferromanganese for export to America, as compared with $135 a ton for English users. In July, 1919, plates were reported sold for export at $50 to $56 per ton, New York, while American steel makers were paying $1.25 to $1.30 per unit, seaboard, for manganese ore (present price 25c. to 30c. per unit).

Blast Furnace Men In South Organize

BIRMINGHAM, ALA. — With Charles L. Bransford, district manager of Republic Steel Corp., as president, organization of the Southern Blast Furnace and Raw Materials Association was completed at a meeting here of 23 executives of blast furnace, coke works and raw material firms. The organization was formed at a gathering at the Birmingham Country Club, with J. E. Urquhart, general manager of Woodward Iron Co., as host.

Other officers include Mr. Urquhart, vice-president; F. H. Crockard, Jr., Republic metallurgist, secretary; and J. M. Spearman, superintendent, Fairfield steel works of Tennessee Coal-Iron & Railroad Co.; Fred Osborne, superintendent, Woodward blast furnaces and coke works; Ben Davis, vice-president, Sloss-Sheffield Steel & Iron Co.; A. G. Overton, general superintendent, Alabama By-Products Corp.; G. N. Harris, superintendent, T.C.I. blast furnaces, and C. S. Lawson, superintendent, Sloss furnaces, directors.

Other charter members include: C. W. Phillips, chief engineer, E. R. Merrill, superintendent, coke works; Percy E. White, assistant superintendent, coke works, and M. K. McVhie, superintendent, blast furnaces, Woodward Iron Co.; W. E. Curran, superintendent, furnaces and coke works, J. M. Hassler, chief engineer, and W. M. Stewart, maintenance superintendent, Republic Steel Corp.; J. V. Blackburn, superintendent, coke works, G. R. Armstrong, chief engineer, and Leon Ehrman, superintendent, furnaces, Sloss-Sheffield, and W. D. Harris, superintendent, Fairfield furnaces; J. A. Maxwell, superintendent, Ensley furnaces; J. J. Phillips, superintendent, coke works, and D. D. Cox, assistant superintendent, coke works, Tennessee Coal, Iron & Railroad Co.

SWOC Wins Oliver Steel Election, 598 Votes to 116

PITTSBURGH—The SWOC last week, through an NLRB supervised election, won the right to be the exclusive bargaining agency for production and maintenance employees of the Oliver Iron & Steel Co. The vote was 598 in favor of the SWOC to 116 against the union. Only the SWOC was named on the "yes" or "no" ballot in a consent election.

Labor Board Outlaws Bethlehem Unions to Assist SWOC Campaign

Orders 21-yr. old plans of collective bargaining abandoned; Company calls ruling unconstitutional, files petition with Appeals Court

THE National Labor Relations Board the past week handed down the long-expected order for the breaking up of Bethlehem Steel Co.'s 21-yr. old plan of employee representation.

This ruling—which seems to be headed for an ultimate Supreme Court decision by way of the District of Columbia appeals court—found Bethlehem quick to declare that the Labor Board itself was interfering with collective bargaining in the company's plants.

"We believe that under the (Wagner) Act neither the Labor Board or the CIO has the right or the power to deprive our employees of the right to bargain collectively through organizations freely chosen by them," said Eugene G. Grace, Bethlehem president. "The board's decision, if enforced, would do just that."

Decision Accompanies "New Drive"

By a coincidence the Labor Board decision on Bethlehem came shortly after Philip Murray, SWOC leader, announced a "new" campaign against Bethlehem. Mr. Murray, who frequently forecast the board's decisions, this week was ready with a statement that "within a very short time there will be a demand made by the SWOC upon Bethlehem Steel for a signed contract." Simultaneously the SWOC leader made another prophecy as to the Labor Board's acts—that when the board hands down a decision in "the Youngstown Sheet & Tube case (similar to Bethlehem), the SWOC will have been shown as right again."

Industry, meanwhile, noted that the Labor Board, under attack from all sides, had given a 2-man decision against Bethlehem's long-established plans of employee representation, that William M. Leiserson, new member appointed recently to give the board "balance" had not shared in the Bethlehem decision because the hearings were held before he became a member.

The board's order against Bethlehem held that the company engaged in a long course of interference designed to insure the fact that the plans would remain the chief form of representation of its employees, and were designed to prevent any other form of labor organization from replacing them. "In praising the plans and emphasizing their accomplishments, in presenting to the men certain material benefits of its industrial relations policy as achievements of the plans, and in expressing to the men its animus against the SWOC, both directly and by means of invidious comparisons of the SWOC with the plans, the respondents insured the continuance of the effects of its interference with the formation of the plans," the board said.

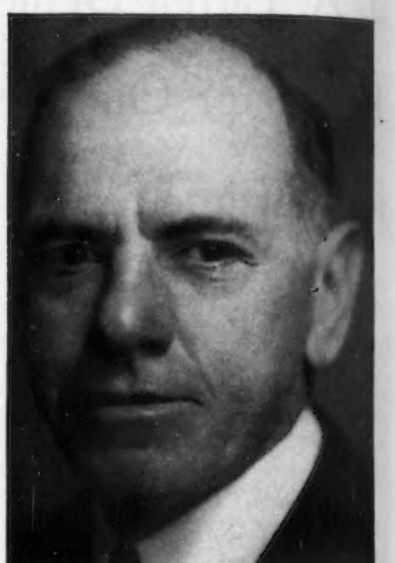
While the order criticized the company, the board dropped charges that the company had allegedly offered inducements to certain employees not to join or help the union, conducted a so-called "back to work" movement in violation of section 7 of the law; interfered with peaceful picketing by striking employees; and caused union members to be attacked and beaten in the Johnstown plant.

Examiner's Conduct "Capricious"

The appeal, filed by company attorneys within 24 hours after the NLRB had issued its order, denied that the alleged violation had any effect upon interstate commerce, insisted that construction of the law to apply to the purported violations was unconstitutional, and declared that the representation plans were not company dominated. Board members were not impartial because they "possessed a fixed bias and entertained a fixed prejudice against employers in general and the (Bethlehem) petition in particular," counsel for the company said, adding that Examiner Frank Bloom's conduct of the hearing was "arbitrary, capricious and unfair, and resulted in awarding preferential treatment to the board."

Said Mr. Grace:

"Our company policy is simply stated. The wishes of our employees are paramount. They can have any collective bargaining organization they want and we will bargain collectively with it. We believe, however, that our employees should be protected from being forced by any one to accept an organization they do not want."



EUGENE G. GRACE

"Our employees can have any collective bargaining organization they want and we will bargain collectively with it."

New Ore Processing Plant To be Built in Texas

H. C. COCKBURN, 3201 University Street, Houston, Tex., and associates, have acquired 100 acres of land on Houston ship channel, about 20 miles from that city, as a site for a new iron ore processing plant, comprising several one and multi-story units, with natural gas-operated furnaces for smelting under a new process. The plant will have an initial capacity of about 100 tons of pig iron per day. Iron ore will be obtained from mines in East Texas district and a contract for developing and operating mining properties has been made with Gifford-Hill Co., Mercantile Building, Dallas, Tex.

The new plant will cost about $400,000 and is scheduled for completion before the close of the year. Mr. Cockburn, noted, is an official of Cockburn Oil Corp., Esperson Building, Houston, and will head the new company to be organized to carry out the project. A. S. Bergendahl, Bankers' Mortgage Building, Houston, is consulting engineer.

List of Exhibitors, Machine Tool Show, Cleveland Auditorium, October 4-13, 1939

A

Abrasive Machine Tool Co. East Providence, R. I.
Acme Machinery Co. Cleveland
Acme Machine Tool Co. Cincinnati
Ahlberg Bearing Co. Chicago
Ajax Mfg. Co. Cleveland
Allegheny Ludlum Steel Corp. Pittsburgh
Charles G. Allen Co. Barre, Mass.
Allen-Bradley Co. Milwaukee, Wis.
Allen Mfg. Co. Hartford, Conn.
Allis-Chalmers Mfg. Co. Milwaukee
Louis Allis Co. Milwaukee, Wis.
American Broach & Machine Co. Ann Arbor, Mich.
American Felt Co. New York
American Foundrymen's Association, Inc. Chicago
American Machinist New York
American Tool Works Co. Cincinnati
Ampco Metal, Inc. Milwaukee
Arter Grinding Machine Co. Worcester, Mass.
Assoc. Machine Tool Dealers of America Philadelphia
Automotive Industries Philadelphia
Avey Drilling Machine Co. Cincinnati

B

Baker Brothers, Inc. Toledo, Ohio
Baker Industrial Truck Div., The Baker-Raulang Co. Cleveland
Barber-Colman Co. Rockford, Ill.
Bardons & Oliver, Inc. Cleveland
Barnes Drill Co. Rockford, Ill.
W. F. & John Barnes Co. Rockford, Ill.
Barrett-Cravens Co. Chicago
Bausch & Lomb Optical Co. Rochester, N. Y.
Charles H. Besly & Co. Chicago
Black & Decker Mfg. Co. Towson, Md.
G. S. Blakeslee & Co. Chicago
Blanchard Machine Co. Cambridge, Mass.
Bodine Corp. Bridgeport, Conn.
Bower Roller Bearing Co. Detroit
Bristol Co. Waterbury, Conn.
Brown & Sharpe Mfg. Co. Providence, R. I.
Bryant Chucking Grinder Co. Springfield, Vt.
Buffalo Forge Co. Buffalo, N. Y.
Bullard Co. Bridgeport, Conn.
Bunting Brass & Bronze Co. Toledo, Ohio

C

Carboloy Company, Inc. Detroit
Carborundum Co. Niagara Falls, N. Y.
Carlton Machine Tool Co. Cincinnati
Century Electric Co. St. Louis
Chicago Rivet & Machine Co. Chicago
Cimatool Co. Dayton, Ohio
Cincinnati Bickford Tool Co. Cincinnati
Cincinnati Gilbert Machine Tool Co. Cincinnati
Cincinnati Milling Machine Co., and Cincinnati Grinders, Inc. Cincinnati
Cincinnati Planer Co. Cincinnati
Cincinnati Shaper Co. Cincinnati
Cleereman Machine Tool Co. Green Bay, Wis.
Cleveland Automatic Machine Co. Cleveland
Cleveland Hobbing Machine Co. Cleveland
Cleveland Planer Company Cleveland
Cleveland Twist Drill Co. Cleveland
Cleveland Worm & Gear Co. Cleveland
Colonial Broach Co. Detroit
Cone Automatic Machine Co., Inc. Windsor, Vt.
Consolidated Machine Tool Corp. Rochester, N. Y.
Crucible Steel Co. of America New York
Cuno Engineering Corp. Meriden, Conn.
Cushman Chuck Co. Hartford, Conn.
Cutler-Hammer, Inc. Milwaukee, Wis.

D

Davenport Machine Tool Co. Rochester, N. Y.
Dayton Rubber Mfg. Co. Dayton, Ohio

E

Eastern Machine Screw Corp. New Haven, Conn.
Elwell-Parker Electric Co. Cleveland
Euclid Electric & Mfg. Co. Euclid, Ohio
Ex-Cell-O Corp. Detroit

F

Fafnir Bearing Co. New Britain, Conn.
Farval Corp. Cleveland
Federal Products Corp. Providence, R. I.
Fellows Gear Shaper Co. Springfield, Vt.
Firth-Sterling Steel Co. McKeesport, Pa.
Foote-Burt Co. Cleveland
Ford Motor Co., Johansson Div. Dearborn, Mich.
Fosdick Machine Tool Co. Cincinnati
Foster Machine Company Elkhart, Ind.
Frew Machine Co. Philadelphia
Fulton Foundry & Machine Co., Inc. Cleveland

G

Gallmeyer & Livingston Co. Grand Rapids, Mich.
Gardner Machine Co. Beloit, Wis.
General Electric Co. Schenectady, N. Y.
General Machinery Corp. Hamilton, Ohio
Geometric Tool Co. New Haven, Conn.
Giddings & Lewis Machine Tool Co. Fond du Lac, Wis.
Gisholt Machine Co. Madison, Wis.
Gleason Works Rochester, N. Y.
Gogan Machine Corp. Cleveland
George Gorton Machine Co. Racine, Wis.
Goss & deLeeuw Machine Co. New Britain, Conn.
Gould & Eberhardt Newark (Irvington), N. J.
G. A. Gray Co. Cincinnati
Greenerd Arbor Press Co. Nashua, N. H.
Greenlee Bros. & Co. Rockford, Ill.

H

Hall Planetary Co. Philadelphia
Hanchett Manufacturing Co. Big Rapids, Mich.
Hannifin Manufacturing Co. Chicago
Hanson-Whitney Machine Co. Hartford, Conn.
Hardinge Brothers, Inc. Elmira, N. Y.
R. G. Haskins Co. Chicago
Heald Machine Co. Worcester, Mass.
Hendey Machine Co. Torrington, Conn.
Hitchcock Publishing Co. Chicago
Hoefer Mfg. Co., Inc. Freeport, Ill.
Hyatt Bearings Division, General Motors Sales Corporation Harrison, N. J.

I

Illinois Tool Works Chicago
Ingersoll Milling Machine Company Rockford, Ill.
International Machine Tool Co. Indianapolis
International Nickel Co., Inc. New York
The Iron Age New York

J

Chas. L. Jarvis Co. Middletown, Conn.
Jones & Lamson Machine Co. Springfield, Vt.

K

Kearney & Trecker Corp. Milwaukee
Kent-Owens Machine Co. Toledo, Ohio
King Machine Tool Co. Cincinnati
W. B. Knight Machinery Co. St. Louis

L

Lake City Malleable Co. Cleveland
Landis Machine Co. Waynesboro, Pa.
Landis Tool Co. Waynesboro, Pa.
Lapointe Machine Tool Co. Hudson, Mass.
R. K. LeBlond Machine Tool Co. Cincinnati
Leland-Gifford Co. Worcester, Mass.
W. C. Lipe, Inc. Syracuse
Lodge & Shipley Machine Tool Co. Cincinnati
Logansport Machine, Inc. Logansport, Ind.
Lucas Machine Tool Co. Cleveland
Lufkin Rule Co. Saginaw, Mich.

M

McGill Mfg. Co. Valparaiso, Ind.
Machinery New York
Macklin Co. Jackson, Mich.
Madison-Kipp Corp. Madison, Wis.
Marlin-Rockwell Corp. Jamestown, N. Y.
Mattison Machine Works Rockford, Ill.
Michigan Tool Co. Detroit
Micromatic Hone Corp. Detroit
Mill & Factory New York
Modern Machine Shop Cincinnati
Moline Tool Co. Moline, Ill.
Monarch Machine Tool Co. Sidney, Ohio
Motor Improvements, Inc. Newark, N. J.
Murchey Machine & Tool Co. Detroit

N

National Acme Co. Cleveland
National Broach & Machine Co. Detroit
National Machinery Co. Tiffin, Ohio
New Britain-Gridley Machine Div. New Britain Machine Co. New Britain, Conn.
New Departure, Div. General Motors Sales Corporation Bristol, Conn.

Norma-Hoffmann Bearings Corp. Stamford, Conn.
Norton Co. Worcester, Mass.

O

Oakite Products, Inc. New York
Oilgear Co. Milwaukee, Wis.
O. K. Tool Company, Inc. Shelton, Conn.
Oliver Instrument Company Adrian, Mich.
Oster Mfg. Co. Cleveland

P

Parker Appliance Co. Cleveland
The C. F. Pease Co. Chicago
Peerless Machine Co. Racine, Wis.
Penton Publishing Co. Cleveland
Physicists Research Co. Ann Arbor, Mich.
Porter-Cable Machine Co. Syracuse, N. Y.
Potter & Johnston Machine Co. Pawtucket, R. I.
Pratt and Whitney, Div. Niles-Bement-Pond Co. Hartford, Conn.
Producto Machine Co. Bridgeport, Conn.

R

Racine Tool & Machine Co. Racine, Wis.
Railway Mechanical Engineer New York
Reed-Prentice Corp. Worcester, Mass.
Reeves Pulley Co. Cleveland
Rivett Lathe & Grinder, Inc. Boston, Mass.
Rockford Machine Tool Co. Rockford, Ill.
Roller Bearing Co. of America Trenton, N. J.
Rotary Lift Co. Memphis, Tenn.
Rotor Tool Co. Cleveland

S

Safety Equipment Service Co. Cleveland
William Sellers & Co., Inc. Philadelphia
Seneca Falls Machine Co. Seneca Falls, N. Y.
Sidney Machine Tool Co. Sidney, Ohio
S K F Industries, Inc. Philadelphia
Skinner Chuck Co. New Britain, Conn.
Springfield Machine Tool Co. Springfield, Ohio
Standard Oil Co. (Indiana) Chicago
Standard Tool Co. Cleveland
L. S. Starrett Co. Athol, Mass.
D. A. Stuart Oil Co., Ltd. Chicago
Sundstrand Machine Tool Co., & Sundstrand Pump Div. Rockford, Ill.
Sun Oil Co. Philadelphia
Synthane Corp. Oaks, Pa.

T

Taft-Peirce Mfg. Co. Woonsocket, R. I.
Taylor & Fenn Co. Hartford, Conn.
Thompson Grinder Co. Springfield, Ohio
Timken Roller Bearing Co. Canton, Ohio
Tool-Die-Machine Progress Cleveland
Twin Disc Clutch Co. Racine, Wis.

U

Union Mfg. Co. New Britain, Conn.
Universal Boring Machine Co. Hudson, Mass.

V

Van Norman Machine Tool Co. Springfield, Mass.

W

O. S. Walker Co., Inc. Worcester, Mass.
Warner & Swasey Co. Cleveland
Westinghouse Electric & Mfg. Co. East Pittsburgh, Pa.
Whitney Chain & Mfg. Co. Hartford, Conn.
Whitney Metal Tool Co. Rockford, Ill.
J. H. Williams & Co. New York
Wilson Mechanical Instrument Co., Inc. New York

Y

Yale & Towne Mfg. Co. Philadelphia

Steel Men to Speak At Safety Congress

CHICAGO—Operating and safety officials from a number of steel companies will be among the speakers at the meeting of the metals section at the 28th National Safety Congress, Oct. 16 to 19, Atlantic City. Activities of the metals section will be discussed by the general chairman, Mell E. Trammell, safety supervisor, Republic Steel Corp., Alabama City, Ala., after which J. M. Hassler, district chief engineer, for Republic in Birmingham, will speak on "Coordination of Engineering and Safety."

William Johnstown, Jr., special representative of the Mackintosh-Hemphill Co., Pittsburgh, will tell of his experiences in the "Safe Handling of Molten Metal and Slag in Foundries." "How to Handle Safety Effectively with Management, Supervisors and Workers" will be discussed by H. W. Darr, supervisor or safety, Bethlehem Steel Co., Johnstown, Pa.

A panel discussion on safety in the metals industry will be participated in by J. E. Culliney, safety engineer, Bethlehem Steel Corp., Bethlehm, Pa., F. A. Lauerman, superintendent, industrial relations, Republic Steel Corp., South Chicago, C. S. Phillips, personnel director, Revere Copper & Brass, Inc., Rome, N. Y., and Homer L. Rogers, personnel director, Sheffield Steel Corp., Kansas City. The discussion leader will be W. A. Jarvis, director of personnel, Chase Brass & Copper Co., Waterbury, Conn.

Several important causes of accidents in metal working plants will be discussed on the final day of the meeting. These include papers on "Handling of Flat Rolled Steel," by P. J. Bowen, superintendent, box annealing department, Great Lakes Steel Corp., Ecorse, Mich., "Safe Crane Operation," J. M. Darbaker, general superintendent, Gary sheet and tin mills, Carnegie-Illinois Steel Corp., Gary, Ind., "Safe Crane Maintenance," F. O. Schnure, electrical superintendent, Bethlehem Steel Co., Sparrows Point, Md., and "Safe Handling of Acids and Caustics in the Metals Industry," by R. W. Campbell, superintendent, by-products department, Jones & Laughlin Steel Corp., Pittsburgh.

Western-Austin Co. Modernizes Aurora Plant

CHICAGO—A complete modernization program is underway at the Aurora, Ill., plant of the Western-Austin Co., manufacturers of road-building machinery, earth and stone-handling equipment, crushing plants and railroad dump cars. Among the new buildings under construction are a completely equipped painting building with facilities for painting railroad dump cars and road machinery at the same time; a raw materials storage building, and a large assembly building with meeting room, offices and cafeteria.

Buildings all are one-story with welded rigid-frame construction, without roof trusses. Steel roof decks are covered with 1½ in. of insulation for heating economy in winter and employee comfort in summer. Side walls are continuous steel sash. Skylight area equals 30 per cent of the floor area, which is unobstructed because the type of construction allows large spans between columns. Work should be completed by Nov. 15, according to the consulting engineers, E. O. Sessions Co., Chicago.

R. Hoe & Co. Forms New Industrial Division

PLANTS of R. Hoe & Co., Inc., in New York City and Dunellen, N. J., which for more than 100 years have been identified almost exclusively with the design and manufacture of large newspaper and magazine printing presses, recently announced the formation of a new Industrial Division which has under consideration an ambitious program of diversifying the company's products.

The types of work for which the Industrial Division considers the Hoe plant and personnel well qualified include: Castings; bar work; lathe work; machine tools; milling; motor equipment; planing; shaft work; tool work; steam and diesel engine parts; and miscellaneous others.

CIO Auto Union Wins Over Martin at Packard

(CONCLUDED FROM PAGE 55)

lows: UAW-CIO, 6090; UAW-AFL, 1547; against both, 637; blank ballots, 12; challenged votes, 48; void ballots, 18. 8274 ballots were cast and there are 8897 eligible voters.

Packard employees had been most loyal supporters of Homer Martin and it was the one stronghold where Martin still claimed superiority in numbers after he became affiliated with the AFL.

Other collective bargaining elections called by the NLRB for Chrysler Corp., Motor Products Corp., and Briggs Mfg. Co. have been extended 30 days because officials of the board found it impossible to set up the election machinery within the 20-day period originally ordered by the board. No dates have been set for any of the elections. In these cases, as with Packard, the principal argument is between the AFL and CIO.

S. G. Saunders, of Chrysler, Talks of "Plastics vs. Steel" in Autos

DETROIT—The rapid development of plastics in the last decade or so has led to their adaptation for products in a great many industrial fields, with the automotive industry in recent years getting a large portion of the attention of plastic manufacturers. Rapidly increasing use of plastic parts for automobiles has resulted recently in focusing a great deal of attention on the future plastics, particularly for structural parts of vehicles.

World's Fair exhibits featuring automobiles with large plastic parts, including one molded plastic body, and another car with a molded plastic top, have aroused popular interest and thrown the weight of conversation to the subject of the near-advent of the production of automobile fenders, panels or complete bodies with plastic materials taking the place of steel.

The broadest expression of opinion on this subject came recently from one who is neither essentially a representative of the plastics industry nor a protagonist of steel. A representative of an important automobile corporation, he spoke unofficially, expressing his own viewpoint to members of the American Chemical Society meeting in Baltimore this spring. He is S. G.

HANDLED WITH A YALE ELECTRIC TRUCK

7,500,000 lbs.—3,750 tons . . . A lot of tonnage in any man's language. Yet that's what one operator using a Yale High Lift Electric Truck is able to handle in 3 months for the Atlanta Plant of the King Plow Company.

And the units to be handled are not standard in size or shape. They run the gamut from metal scrapes to the heaviest die cuts. A real handling job if there ever was one.

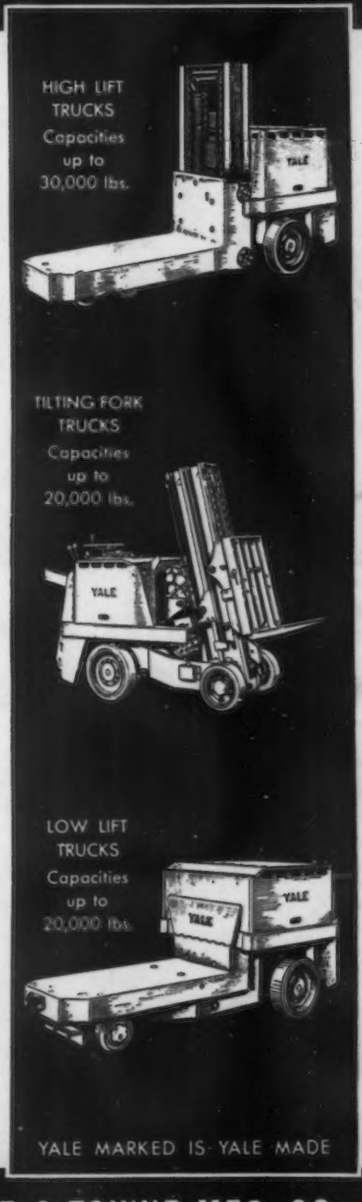
Here's what the King Plow Company has to say about their Yale Electric Truck:

"This truck does a 4-5 day job in 11 hours . . We find many jobs for this equipment which it was not originally installed to do . . . Almost before it was put to work it paid for itself . . . This truck never hesitates even for the longest and steepest ramps . . . It is indispensable—has saved substantially."

Indispensable—Never hesitates—Saved substantially . . . these words means saving and efficiency to the King Plow Company. And they can mean the same to you—for the Yale Electric Truck always conforms to the same service standard—the best.

It has to. Its drive units are more powerful . . . its construction is stronger—its engineering is more advanced. More than just a truck—the Yale Electric Truck is a mechanical efficiency expert! Send for free catalogue giving full information.

Trained sales engineers are located in 56 major industrial centers ready for instant service. Consult your classified directory.



YALE MARKED IS YALE MADE

YALE

THE YALE & TOWNE MFG. CO.
PHILADELPHIA DIVISION, PHILADELPHIA, PA., U. S. A.
IN CANADA: ST. CATHARINES, ONT.

Saunders, staff officer of Chrysler Corp.—close enough to the picture to be sure of the details, and important enough as a critic, so his opinion is worth hearing.

Saunders On Plastics

Straightforwardly in an address "A View of Organic Plastics By One In The Automotive Industry," Mr. Saunders declared:

"It may astonish you to realize the relative unimportance of organic plastics in their present state of development to many in the automotive industry. They are interested—anxious to cooperate—but still a little skeptical, shall we say, that anything accomplished so far can fit in, or take the place of steel in any of the fundamental or structural parts of the automobile.

"We do not overlook the advancement made in laminated glass, electrical application, control knobs and decorative pieces—but these are generally purchased parts and relatively unimportant compared to the building of a car in its entirety."

There is little doubt that the automobile industry would grab quickly at at any material which had more economic advantage than steel. Saunders declared that "the automobile designer has for a long time dreamed of a motor vehicle which could be molded or pressed in one piece out of some composite material which would have high strength, toughness and resistance to shock, beauty of color and a smooth durable finish. The production men dream of a material which can be easily formed or shaped, and which attains a highly polished finish with very little labor or machine work."

Not Limited to Decoration

"You should realize that plastic resins could be made to fit this description if they were only improved. Engineers are actively interested and would consider them for most any part of the car where they would be economically and structurally advantageous, and there is no reason why the thought of their use should be confined to decoration.

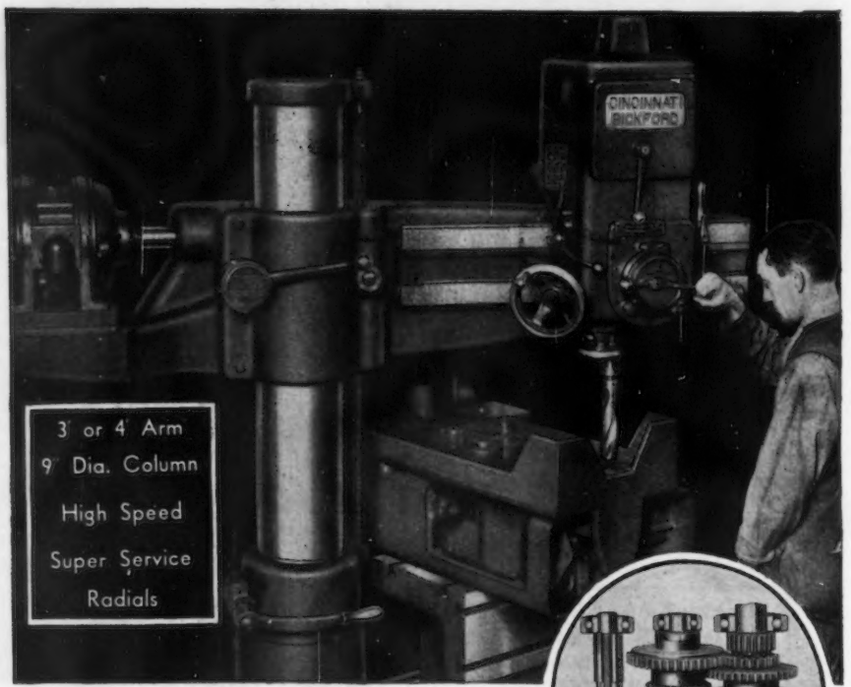
"When they pass the decorative stage and become both decorative and structural they might find a place in such items as inside door panels, whole instrument panels, garnish moldings, grilles, windshield and door windows —even head lamps, hub caps, gas tanks, pumps, pulleys, oil pans, transmission cases, body panels, fenders, etc.

"And the reasons they would consider such drastic changes in materials are that they desire to reduce the weight of the automobile, to reduce labor costs and to reduce the ultimate cost of each car to the prospective owner."

If plastics are to be adopted as a major material they must possess tensile strength of at least 40,000 lbs. per sq. in. to compete with body steel; compressive strength should equal this; and the shear strength should reach a figure at least three-fourths of the tensile strength, Saunders declared. The ideal plastic for prospective use in the automobile would have the strength and rigidity of alloy steel, the ease of forming and shaping of potter's clay, the toughness of sugar maple, the colors of the rainbow and the finish of superfinished tool steel, he said in outlining the goals at which the plastic industry must aim.

Must Follow Hooke's Law

To accomplish all this in a year or so would be impossible by the boldest



9 Spindle Speeds Only 11 Gears

Years of quiet, trouble-free, efficient operation are assured from this radial drill gear train. Nine spindle speeds are obtained with but eleven gears and at each speed there are only two gear contacts. This vital part of the Super Service Radial is noted for its compact simplicity.

Other construction features include—hardened chrome nickel steel gears, multiple splined shafts and anti-friction bearings which are automatically oiled and completely sealed against dirt.

Write for Bulletin R-21A.

THE CINCINNATI BICKFORD TOOL CO.
OAKLEY CINCINNATI OHIO U.S.A.

of pioneers in plastics research, according to Saunders.

This speaker outlined specifically some of the characteristics which plastics must attain for more general adoption in the automobile industry:

"One of the desirable characteristics of cast iron and steel in all mechanisms is the ability to withstand high stresses with very little or no deflection; in other words, they possess a high modulus of elasticity. Plastics will have to have their modulus increased to 12-15 millions in order to keep deflections within good production and engineering limits. Not only must they possess this quality, but they must have a defiite stress-strain ratio. This would mean that they should follow Hooke's law and should not undergo dimensional change at low stress, nor cold flow.

"Many parts on an automobile in the proximity of the engine are exposed to high temperatures. In order to use plastics for these parts the strength must remain fairly constant up to around 500 deg. F. Other parts which are exposed to the elements experience temperature changes from 140 deg. F. down to 50 to 60 deg. below zero. These parts must not become embrittled at low temperatures and must retain their original structural strength. Impact strengths around three ft.-lb. (A.S.T.M.) would be acceptable at these temperature extremes.

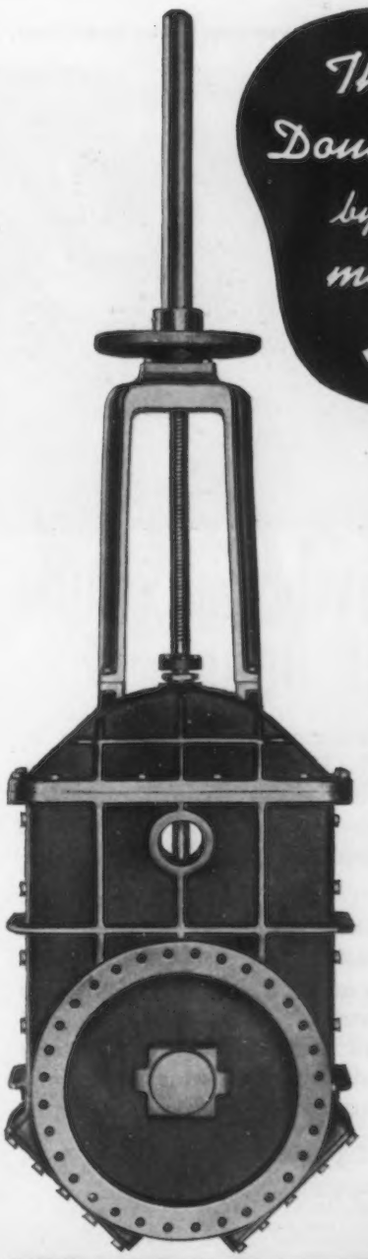
Bonding Might Be Used

"Decorative plastic materials which are attached to metal parts should possess coefficients of expansion very near or equal to that of steel, or to whatever metal to which they are attached. Some flexible but high strength plastic bonding material might be used as an intermediate material between the plastic decorative material and the metal insert or backing. However, it would be very desirable to have a plastic of the same expansion coefficient as that of steel.

"One other property which would be highly desirable is that obtained by alloys in steel and cast iron. These properties are variable strengths, ductilities, and hardnesses obtainable by heat or chemical treatment. This property alone would insure the adoption of plastics by the automotive industry. It might be profitable to the plastics industry to steal a page from the book of research in alloy steels and irons."

Fabricating properties of plastics present some of the most important objections to their general adoption in the place of steel parts. "Many parts of automobiles formerly produced by casting or other hot forming operations are now produced by cold working," Saunders pointed out. "The body panels, wheels, frames, and many small parts are produced by cold stamping or pressing. Small parts like bolts, lever, and rod ends are manufactured by means of cold upsetting operations. These methods have been adopted because of the elimination of many operations, speed of production, and subsequent savings in cost.

"The long heating operation used in the molding and forming of plastics is unsatisfactory from the standpoint of the time during which the dies and presses are not working. If the plastic material in the form of sheets or blanks were preheated outside of the press and dies, and then stamped or rapidly pressed to the desired shape, the number of pieces per machine and per man could be increased to a point where plastic molding would be feasible for use in the automotive industry. Alternative to this would be a material



This new improved Double-seated Gas Valve by **BRASSERT** *makes a* POSITIVE SEAL

IT has four ports, two large, in the valve, two small in the hood. The valve discs are expanded against the seat when the valve is closed, and are retracted to clear before vertical motion begins. The ports in the hood are open for the escape of gas or vapor. When the valve reaches the open position the small seating discs in the center of the main valve discs are expanded against the small ports, closing them completely.

The valve may be:

1 **Mechanically sealed, with escape of any leakage through ports in hood. A stack or exhaust fan may be connected to either hood port.**

2 **Steam sealed.**

3 **Water sealed, with continuous overflow, making a MECHANICAL WATER SEAL.**

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which could be cold formed and subsequently polymerized outside of the dies without warping or cracking."

Must Permit Repair

As a finale, the automotive man presented a group of practical considerations, not one of which could be considered a straw figure set up for the purpose of argument.

"As long as motor vehicles are operated by human beings there will be accidents, and accidents require subsequent repairs," he premised. "If plastics were used for many body parts they must have the ability to be repaired in some manner, by gluing, by patching on new material to cover or replace damaged material, by bonding together parts or sections torn apart in a crash, or by some heating process similar to the welding of metals, or a plastic which can be used exactly as solder is now used to fill up depressions in metals.

"For the sake of safety to the occupants of the 'plastic automobile' and to the occupant of possible colliding vehicles, the material or construction must be fireproof and shatterproof. In fact, the body extremities such as fenders must be capable of absorbing the energy of a crash and thus diminishing the possible harm to passenger within the structure. This would require a material which does not easily fracture, but which rather bends to absorb the shock of collision.

Stabilized Aging

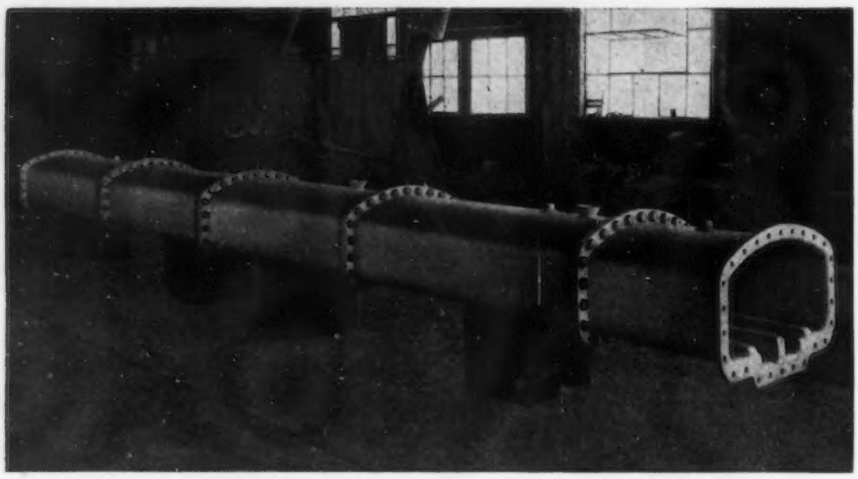
"Automobile manufacturers like others have to maintain large stocks of replacement parts for some ten to fifteen years. Over this period of time the parts must not lose their original structural and functional properties. It is necessary that plastic parts held for replacement stock must possess the same properties after aging for a decade, as they had the day of fabrication. This property of stabilized aging would also apply to the appearance and finish of the parts. The finish must be capable of enduring extremes in climate, and all the handling encountered in manufacturing and storing. In other words, a reasonably hard, durable finish must cover a fade-proof color and a strong but flexible internal structure."

Trade Association Executives To Hear Talk By Bridges

BUSINESS and politics, anti-trust laws, labor and wage-hour acts, cooperation between governmental agencies and educational institutions with trade groups, and public relations in its many phases are topics to be discussed at the annual convention of American Trade Association Executives to be held at the Westchester Country Club, Rye, N. Y., Sept. 20-23. The convention will open with a luncheon at which Senator H. Styles Bridges, Republican, of New Hampshire, will discuss "Business and Politics."

The remainder of the first day will be devoted to consideration of public relations and the consumer. The second day's program will include addresses on the antitrust laws, Wagner Act and wage-hour legislation as they relate to industry, and the relationship of colleges of business with trade associations. Development of new markets, and the value of statistics and business exhibits furnish topics for the third day, which will terminate with a golf tournament. The final day will be spent at the World's Fair where a special A.T.A.E. program is being arranged.

One of a group of MICHIANA Muffles for gas carburizers furnished large bearing manufacturer.



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Michigan City, Indiana

Write for Booklet 108-IA.

MICHIANA
HEAT- AND CORROSION-RESISTANT
ALLOY CASTINGS

J. E. James New Head Of Richard Thomas & Co.

LONDON—The long-awaited announcement of changes on the board of Richard Thomas & Co., £21,000,000 South Wales steel and tinplate combine, has now been issued by the control committee, of which Montague Norman, Governor of the Bank of England, is chairman. The changes are:

Sir William Firth to give up his managing directorship and be chairman only.

John E. James, chairman of the Lancashire Steel Corp., to be managing director.

Sir Charles Wright, chairman of Baldwins; S. R. Beale, chairman of Guest Keen & Nettlefolds, and John Adamson, the finance director, to resign.

Sir James Lithgow, chairman of the Steel Co. of Scotland and many other Scottish enterprises; A. C. Macdiarmid, chairman of Stewarts & Lloyds, and the Earl of Dudley to join the board of Richard Thomas.

Carrier Corp. Gets Large Contract

A CONTRACT for seven centrifugal refrigerating machines to supply cooling for the new Social Security Building now under construction at Washington has been awarded to Carrier Corporation, Syracuse, N. Y. Believed to be the "largest single refrigeration installation to be made at one time for a single building in the history of the air conditioning business," the seven centrifugal refrigerating machines will supply 4200 tons of cooling for the building's air conditioning system. In the seven machines there are said to be over 10,000 tubes, equal to approximately 25 miles of tubing.

List of Lagging PWA Projects is Sought

WASHINGTON—Federal Works Administrator John M. Carmody directed his PWA regional directors last week to compile a list of PWA projects hopelessly bogged down and to see which, if any, can be pushed for completion by June 30, 1940. He said that the PWA faces the possibility of making revisions of allotments for large projects showing no chance for completion by the June, 1940, deadline.

July Scrap Consumption 68 Per Cent Above Year Ago

DOMESTIC consumption of scrap iron and steel in July amounted to 2,551,115 gross tons, a gain of 68 per cent over the 1,519,759 tons used in July, 1938, according to a compilation of the Institute of Scrap Iron and Steel. In June of the present year 2,428,121 tons were consumed.

For the first seven months of this year, consumption was 17,001,670 tons, as compared with 9,822,632 tons in comparable period of 1938, an increase of about 73 per cent. Figures include both home and purchased scrap.

Effective with this issue, statistics on scrap consumption will be published on the Statistical Page of THE IRON AGE as they are made available by the institute.

Handle It "THRU THE AIR" faster, for less!

Out of the aisles—above plant obstructions—"thru the air" handling with P&H Hoists gives you effortless movement of loads with minimum disturbance of routine operations. Your own handling methods, brought up to date, can increase plant efficiency and cut your unit manufacturing costs. Why not ask a P&H Hoist engineer to call? Or, write for literature. The Harnischfeger Corporation, 4401 West National Avenue, Milwaukee, Wisconsin.

HARNISCHFEGER CORPORATION

HOISTS • WELDING ELECTRODES • MOTORS P&H EXCAVATORS • ELECTRIC CRANES • ARC WELDERS

. . . THE NEWS IN BRIEF . . .

Chrysler official outlines how plastics must change to replace steel in fundamental parts of automobile. —Page 59.

Sealed beam headlights ready for 1940 cars.—Page 51.

Automobile production passes low point with 12,955 units built in week; independent producers expected to enjoy better business in 1940.—Page 52.

CIO Auto Union wins over Martin at Packard.—Page 55.

Some New Deal insiders seen hoping for failure of business to stage sharp recovery.—Page 56.

NLRB calls four elections for Vernon plant of Western Pipe & Steel Co. —Page 58.

Pig iron production in Bohemia, Moravia, continues high.—Page 58.

Reich receives $3,600,000 in orders for machinery from Bulgaria.—Page 58A.

Commerce Department issues new "Industrial Market Data Handbook." —Page 58A.

Navy Supplies Bureau awards order for brass, copper, grinding and milling machines.—Page 58A.

War Resources Board, headed by Edward R. Stettinius, Jr., holds its first meeting.—Page 58A.

Business to accept Treasury Department's invitation to discuss tax laws.—Page 58A.

Return on investment in steel industry for first half of 1939 is 1.06 per cent; taxes totaled $55,000,000.—Page 58B.

Illinois Industrial Council to hold conference Aug. 24-25 at Green Lake, Wis.—Page 58B.

Welding wire production in 1938 25 per cent lower than in 1937.—Page 58B.

Dollar volume of construction contracts awarded in 37 eastern states gains 30 per cent in first seven months of 1939.—Page 58B.

Contract is placed for conversion of collier into self-unloading vessel. —Page 58B.

Three hundred exhibitors from 40 industries will display products at Exposition of Chemical Industries. —Page 58B.

Southern Blast Furnace and Raw Materials Association is organized at Birmingham.—Page 58C.

ICC revises pig iron rates from Buffalo to some other New York points.—Page 58C.

Civil rights of industry are ignored, NAM tells La Follette.—Page 58C.

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MEETINGS

Aug. 28 and 29—Institute of Scrap Iron and Steel, Cleveland.

Aug. 28 to 31—American Mining Congress, Salt Lake City.

Sept. 4 to 8—British-American Engineering Congress, New York.

Sept. 8 and 9—American Ceramic Society, Conneaut Lake, Pa.

Sept. 14 to 17—National Association of Foremen, Pittsburgh.

Sept. 20 to 22—National Industrial Advertisers Association, New York.

Sept. 26 to 29—Association of Iron and Steel Engineers, Pittsburgh.

Oct. 4 to 13—National Machine Tool Builders' Association, Cleveland.

Oct. 5 to 7—Society of Automotive Engineers, aircraft production meeting, Los Angeles.

Oct. 6 to 7—Foundry Equipment Manufacturers Association, White Sulphur Springs, W. Va.

Oct. 16—Society of Automotive Engineers, annual dinner, New York.

Oct. 16 to 20—National Safety Congress and Exposition, Atlantic City, N. J.

Oct. 23 to 27—National Metal Congress, Chicago.

Growing use of oil on ships may cut United Kingdom's bunker coal prices.—Page 58D.

Japan displaces Soviet as chief buyer of U. S. metal working machinery. —Page 58D.

U. S. tin plate shipment is admitted to Spain; other imports barred.—Page 58D.

H. D. Hudson Mfg. Co. improves its plant at Oshkosh, Wis.—Page 58D.

Government steel orders in week ended Aug. 12 total $844,564—Page 58D.

Gouged British with high steel prices during World War.—Page 58E.

SWOC wins NLRB election at Oliver Iron & Steel Co., 589 to 116.—Page 58E.

Labor Board outlaws Bethlehem unions to assist SWOC campaign. —Page 58F.

New ore processing plant will be built near Houston, Texas.—Page 58F.

List of exhibitors at Machine Tool Show at Cleveland Auditorium, Oct. 4-13, 1939.—Page 58G.

Western-Austin Co., machinery builder, modernizes its Aurora, Ill., plant.—Page 58H.

R. Hoe & Co., printing press manufacturer, forms new industrial division.—Page 58H.

Steel Men to speak at Safety Congress.—Page 58H.

Trade Association executives to hear talk by Senator Bridges.—Page 62.

J. E. James new head of Richard Thomas & Co.—Page 63.

Carrier Corp. to provide 4200 tons of "cooling" for Social Security Building.—Page 63.

Lagging PWA projects to be pushed for completion by June 30, 1940. —Page 63.

Ending of automobile model year forces THE IRON AGE index of capital goods activity down 1.9 points to 63.2.—Page 72.

July scrap consumption 68 per cent above like month of 1938.—Page 63.

Federal Shipbuilding receives $9,545,000 ship contract.—Page 69.

A.S.M.E. and Foremen's Association announce Machine Tool Show meeting programs.

ACES TAKE THE MONEY

Aces mean sure profit in a poker game. And Baker machine tools are your aces for efficient, economical drilling, boring or tapping operations.

Expert recommendations based on years of sound engineering experience to fit your exact requirements. Let us help you lower costs. Send blueprints or sample parts today.

BAKER BROTHERS, INC.

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★ BAKER ★

ARTHUR N. VOGT, who has been associated with the sales department of Youngstown Sheet & Tube Co., Youngstown, since 1933, has been appointed sales manager of the Youngstown district. He has been in charge of sales of Yoloy since the development of this product.

Prior to his connection with Youngstown, Mr. Vogt was identified with the United Alloy Steel Co., Cleveland, for three years and was with Central Alloy Steel Co., Massillon, Ohio, for 12 years.

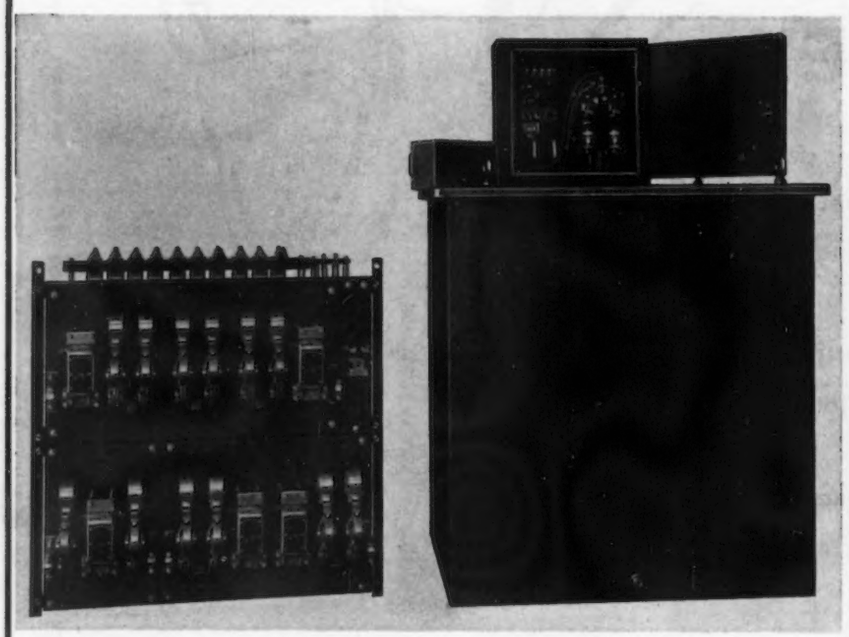
❖ ❖ ❖

LAWRENCE E. JOSEPH has been appointed executive officer in charge of the Blaw-Knox division, Blaw-Knox Co., Pittsburgh, succeeding R. F. McCLOSKEY, SR., a company vice-president who has been placed in charge of the development of new products for the entire corporation.

Mr. Joseph formerly was manager

EC&M STARTER for

LONG-TIME STARTING OF SCAVENGER BLOWER DRIVE



THIS illustration shows an EC&M Oil-immersed, Auto-transformer Starter for reduced voltage starting of a 350, 440 Volt motor driving a scavenger blower in a municipal diesel plant. Starting current is kept low by providing a heavy duty starter capable of long-time acceleration on the auto-transformers. Transition from reduced voltage to full line voltage is by EC&M NEO-TIME Control which is conveniently located in overload relay compartment. View at right shows enclosing cover for NEO-TIME panel setting on oil-tank cover.

View at left above shows EC&M Type LZ Magnetic Contactors for handling the main motor circuit. They are mounted in the oil-tank with auto-transformers and are completely oil-immersed. During transition, the circuit to the motor is not broken; instead, continuous torque is applied to the motor from the instant of starting.

EC&M Booklet No. 88 illustrates this attractive unit as well as many other custom built motor controls. Write today for your copy.

THE ELECTRIC CONTROLLER & MFG. CO. E&M CLEVELAND, OHIO

HEAVY DUTY MOTOR CONTROL FOR CRANES, MILL DRIVES AND MACHINERY • BRAKES • LIMIT STOPS • LIFTING MAGNETS AND AUTOMATIC WELD TIMERS.

. . . PERSONALS

LAWRENCE E. JOSEPH, executive officer in charge of the Blaw-Knox division, Blaw-Knox Co.

of the National Automatic Tool Co., Richmond, Ind., and prior to that, was a vice-president of the Liggett Spring & Axle Co.

❖ ❖ ❖

B. F. MERCER, formerly vice-president in charge of operations for the Union Steel Casting Co., Pittsburgh, has been appointed to the steel foundry sales staff, with headquarters at Brackenridge, Pa., of Allegheny Ludlum Steel Corp., Pittsburgh. He has been identified with the steel foundry trade since 1912 when he served the Union Steel Casting Co. first as foreman and then as general superintendent until 1928. In 1929 he became manager of the Sharon, Pa., works of Pittsburgh Steel Foundry Corp. and returned to Union Steel Casting the following year as vice-president in charge of operations.

❖ ❖ ❖

FRED G. GRONEMEYER has been promoted to plant manager of the Springfield, Mass., plant of the plastics division of Monsanto Chemical Co., St. Louis. He has been resident engineer for the plant since April of this year. He was graduated from Washington University, St. Louis, in 1924, with a bachelor's degree in mechanical engineering.

SNALS . . .

B. F. MERCER, new member of steel foundry sales staff of Allegheny Ludlum Steel Corp.

From 1924 to 1929, he was employed on design and construction work by the Barber Asphalt Co., Madison, Ill., and in May, 1929, joined Monsanto as a plant maintenance and construction engineer. In 1935, he was transferred to the research department as a development engineer, and in July, 1938, was sent to Springfield as development Engineer for the plastics division plant.

❖ ❖ ❖

JOHN M. LOVE has been made general manager of the Akron Brass Co., Wooster, Ohio.

❖ ❖ ❖

E. J. SCHERER has been made superintendent of the Sandusky, Ohio, department of Kelley Island Lime & Transport Co., and LLOYD N. BEUTHEL, formerly in the Buffalo office, has been named sales manager at Sandusky. Formerly both positions were administered by the late F. W. Ohlemacher.

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KENNETH T. FRENCH has been placed in charge of the newly-established warehouse in Toledo of Allegheny Ludlum Steel Corp., Pittsburgh.

Previous to taking charge of this new warehouse, Mr. French served for a number of years in the Cleveland district office under W. H. WHITE, district manager. He will be assisted in the Toledo district by D. G. HOYT, sales engineer, who has had many years of metallurgical training and experience.

Although a branch of the Cleveland office and warehouse, the new Toledo warehouse is self-contained and will carry stocks of tool steel, stainless steel bars and Ludlite, in addition to being in a position to readily draw on the Allegheny Ludlum warehouses in Detroit, Chicago, and Cleveland.

WALDO F. TUCKER has been appointed manager of the Los Angeles office of Acme Steel Co., Chicago. Mr. Tucker has been associated with Acme in southern California for 13 years. Working with the new manager will be NORMAN D. MEAD, another experienced Acme representative.

❖ ❖ ❖

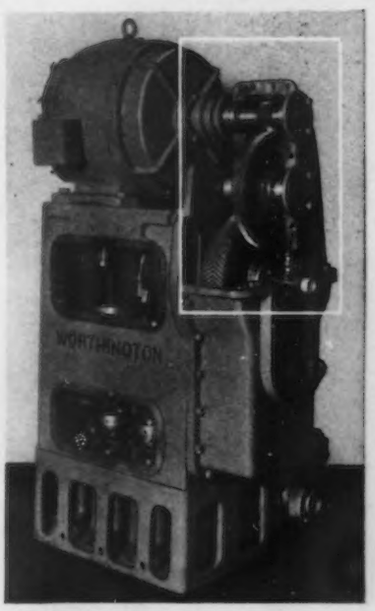
GEORGE R. FORD, JR., grandson of the founder of the Edward Ford Plate Glass Co. now an integral unit in Lib-

FARREL-SYKES GEARS

Assure Extra Dependability in Worthington Marine Pumps

Because marine duty requires equipment that will stand up in continuous service without failure, Worthington use Farrel-Sykes Gears to drive their vertical triplex plunger boiler feed pump here illustrated.

In addition to dependable performance they get all the other advantages inherent in Farrel-Sykes Gears. Precision generation by the famous Sykes process makes these gears exceptionally quiet and smooth-running. The continuous herringbone teeth provide more bearing surface and extra strength which reduce tooth stresses and increase load-carrying capacity. Thus, it is often possible to use herringbone gears of smaller size with resultant savings in weight, space and cost.



Farrel-Sykes Herringbone Gears are used in this Vertical Triplex Plunger Boiler Feed Pump built by Worthington Pump and Machinery Corp., Harrison, N. J.

The combined characteristics of overlap or interlacing of the teeth, creeping engagement and inclined line of pressure reduce wear and maintain the involute profile and correct tooth action throughout the life of the gears. Increased life, continuous operating efficiency and maintenance economy are thus secured.

Farrel-Sykes Gears and Gear Units are made for any capacity and for every type of service. When you have a gear problem Farrel engineers will work with you to find the answer.

FARREL SYKES GEARS

FARREL-BIRMINGHAM COMPANY, Inc.
333 VULCAN STREET - - - - - - - BUFFALO, N. Y.
The Gear with a Backbone

bey-Owens-Ford Glass Co., has been named assistant general factory manager of the Rossford plant, which his grandfather started. He has worked in the plant for 10 years. CURTISS W. DAVIS has been named general factory manager, succeeding to a vacancy caused by death. He has been with the company since 1923.

❖ ❖ ❖

MARTIN C. HAUSMAN, steel buyer and assistant to the purchaser of the Electro-Motive Corp., La Grange, Ill., has resigned, effective Sept. 1, to enter private law practice. He is at present a director of the Steel Club of Chicago.

❖ ❖ ❖

EUGENE J. BENGE has established himself as a management engineer at 20 North Wacker Drive, Chicago.

❖ ❖ ❖

ROBERT N. YATES, who has been identified with the sales department of Erie Foundry Co., Erie, Pa., for a number of years, has been made assistant sales manager.

JOHN R. COX, whose appointment as vice-president and general manager of the Weatherhead Co., Cleveland, was announced in The Iron Age of July 27.

J. DOUGLAS DARBY has been appointed manager of sales, Carnegie-Illinois Steel Corp.'s Philadelphia district. Mr. Darby has been associated with the steel industry in operating and sales capacities for 19 years. He was employed in the open-hearth department of Alan Wood Steel Co. in 1919 and subsequently became general superintendent of the steel division, and assistant to the vice-president in charge of sales.

❖ ❖ ❖

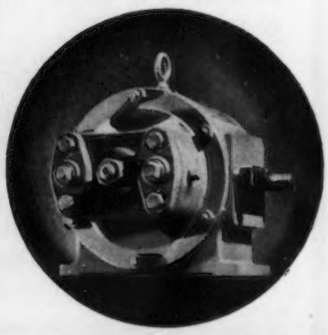
JOHN G. MUNSON has been elected vice-president, raw materials, United States Steel Corp. of Delaware. He succeeds Thomas Moses who retired on Aug. 18, upon reaching the corporation's retirement age of 70 and who will continue in a consulting capacity. Mr. Munson has been president of Michigan Limestone & Chemical Co. since 1928, with which as operating manager he began his connection with United States Steel Corp. subsidiaries. Thomas Moses, the retiring vice-president, has been connected with the coal mining industry during his entire business career. In November, 1910, he became superintendent of Bunsen Coal Co., now United States Fuel Co., and in 1915 became general superintendent of United States Fuel Co., with headquarters at Danville, Ill. In 1927 he was elected president of H. C. Frick Coke Co., United States Coal & Coke Co., and other coal producing subsidiaries of United States Steel Corp. He became a vice-president of United States Steel of Delaware Jan. 1, 1938.

Ease of Hook-up

HELE-SHAW
Fluid Power
HAS IT!

We show you a "zipper" because it illustrates an important advantage for you in driving machines with Hele-Shaw Fluid Power (oil under pressure from a Hele-Shaw Pump). You probably know that when you use Hele-Shaw Fluid Power you can usually save power costs. You know machine speeds and feeds can be precisely controlled with Fluid Power regulators. Now, consider another big advantage—ease of hook-up. Connecting a Hele-Shaw Pump is a simple piping job, almost as easy as z-z-zipping a zipper. Let us show you how to drive with Hele-Shaw Fluid Power and demonstrate how many ways you will benefit.

Other A-E-CO Products:
Lo-Hed Hoists, Taylor Stokers,
Marine Deck Auxiliaries.



A-E-CO Hele-Shaw FLUID POWER

AMERICAN ENGINEERING COMPANY

2410 ARAMINGO AVENUE, PHILADELPHIA, PA.

Hopkins Adds D. P. K. Wood To "Spark-Plug" Crew

WASHINGTON — Secretary of Commerce Hopkins named the seventh member of his "spark-plug" crew early this week by appointing Dudley P. K. Wood, of New York, former assistant vice-president and director of the American Machine & Foundry Co. Mr. Hopkins said the new appointee will concern himself with the promotion of Latin America trade, with which he has had wide experience.

The Secretary's new staff of trouble-shooters, identified as the "spark-plug boys," have been assigned a wide scope of studies covering construction, wartime mobilization and other industrial problems.

Ellicott, Bethlehem Plant Manager, Dies

C. R. ELLICOTT, general manager of the Cambria plant of Bethlehem Steel Co. at Johnstown, Pa., died Tuesday at the age of 54. After graduating from Lafayette College in 1908, Mr. Ellicott joined the Bethlehem organization as a chemist in the laboratory of the Bethlehem, Pa., plant and by 1915 he was made superintendent of No. 1 and No. 3 open hearths. From 1917 to 1927 he served as head of the hot metal division, being made superintendent of the Alloy Mills and Furnaces of the Lehigh Division of the Bethlehem, Pa., plant in 1922. In October, 1928, he was transferred to the Cambria plant as assistant general manager, and in August, 1936, was made general manager, the position he held at the time of his death.

Federal Shipbuilding Receives $9,545,000 Ship Contract

WASHINGTON—The Maritime Commission has awarded a $9,545,000 contract to the Federal Shipbuilding & Dry Dock Co., of Kearney, N. J., for the construction of five steel cargo ships of the C-1 design. To require about 13,250 tons of steel, the ships will be steam-turbine propelled and of the single screw, full scantling type. They will be purchased by the Lykes Brothers Steamship Co.

The latest award brings the total number of C-1 steel cargo ships ordered by the Commission to 14. Five ships also will be built by the Tampa (Fla.) Shipbuilding & Engineering Co., and four by the Consolidated Steel Corp., Ltd., Los Angeles.

The Maritime Commission early this week awarded a $6,750,000 contract to the shipbuilding division of Bethlehem Steel Co., Sparrows Point, Md., for the construction of three steel cargo ships for the Seas Shipping Co., Inc., of New York. To require about 11,700 tons of steel, the ships will be turbine propelled and approximately 485 ft. in overall length.

$4,000,000 Power Plant to Be Built at Mobile

ALABAMA POWER CO., Birmingham, announced on Aug. 18 that it intends to construct a $4,000,000 steam-operated electric generating plant at Mobile, Ala. This will have a capacity of 40,000 kilowatts and will be the first of three units now contemplated.

An Assist! By ATLAS

View at Prominent Iron Foundry

To Lower Costs!

Here Atlas-designed, Atlas-built equipment moves heavy scrap and other charging materials with consummate ease.

Monorail deposits empty bucket on roller conveyor. Bucket *rolls down* to scale platform, is charged with iron, weight read from yard crane cab. Scale platform lowers, turns, bucket *rolls down* to monorail for pick-up and charge to cupola.

A propitious circle, presaging profit at the year-end—and a definitely typical Atlas installation.

THE ATLAS CAR & MFG. CO.

Engineers CLEVELAND, OHIO Manufacturers

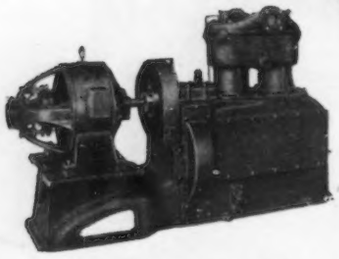
serving the world with mobile handling equipment

Investigate!

AIR . . . COMPRESSORS by Westinghouse

AIR BRAKE CO.

For Varied Pneumatic Requirements



2-V COMPRESSOR

(one of many types)

Two cylinder, single acting, gear driven —75 to 200 cu. ft. Three forms. Single stage, air cooled, intermittent operation, 40 lbs. pressure. Single stage, water cooled, continuous operation, 120 lbs. pressure. Two stage, air cooled, continuous operation, 135 lbs. Motors for any commercial circuit.

Write for information and prices.

Catalogue T-2047

Builders of high grade pneumatic apparatus for 70 years

Westinghouse . . . .

AIR BRAKE CO.

Industrial Division

PITTSBURGH, PA.

Sealed Beam Headlights Ready for 1940 Cars

(CONCLUDED FROM PAGE 51)

a no-glare beam. Its characteristics include a wide distribution of light to the sides of the road, with sharp, clear illumination up the right shoulder, without causing uncomfortable glare to oncoming drivers.

The second, or upper beam, is named the "Country Beam." For use only on the open highway when there is no traffic whatever, it throws its light a considerably greater distance down the road than former types. It bathes road shoulders, warning signs, fences and curves in light, and also permits the driver to see overhanging obstacles such as branches, overpasses and the like.

Red on Country Beam

Cars will have on the instrument panel a signal which will glow red as long as the "Country Beam" is in use.

The new headlamps will be manufactured by all the headlight producers as original equipment and for the replacement market. Differing in some details of construction, mechanically, electrically and optically, the products of all will nevertheless produce the same lighting result, and are wholly interchangeable.

Units in both right and left headlamps are identical, and are so designed that they cannot be improperly installed, nor can the electrical connections be attached in any but the right way. Two types of sealed beam units are available. One is made entirely of hard glass, and the other a composite unit consisting of a metal reflector and a glass lens.

First Shown at Cleveland

At present, there is some doubt that owners of cars equipped with former-type lamps will find it practical to install sealed beam units.

The headlight was put through its paces at Cleveland, Aug. 14, before nearly 400 automotive, lighting and safety experts and trade journal representatives.

The demonstration included afternoon laboratory tests and actual road trials after dark.

Chairman at the demonstration was Paul G. Hoffman, president of the Studebaker Corp. and head of the Automotive Safety Foundation. Speakers included O. E. Hunt, General Motors Corp., chairman of the engineering liaison committee of the automobile industry, and Wilbur L. Cross, Jr., of Connecticut, chairman of the engineering committee of the American Association of Motor Vehicle Administrators.

CAST IRON PIPE

Water Department, Austin, Tex., plans pipe line extensions and replacements in water system. Cost about $100,000 of which $56,000 will be secured through Federal aid.

Denison, Tex., is considering pipe line extensions and replacements in water system. It is proposed to arrange fund of about $240,000 for this and other waterworks installation. A. M. Brenneke is city engineer.

Antlers, Okla., plans pipe line extensions in water system. Special election has been called on Sept. 6 to approve fund of $32,000 for this and other waterworks installation.

Water Department, San Diego, Cal., will take bids soon for about 10,000 ft. of 30-in. monocast cement-lined cast iron pipe for new line for water system in Upas Street, extending from Fifth to Thirtieth Streets; also for valves, fittings, etc. Cost about $150,000. B. D. Phelps is assistant city engineer.

Water Department, Spokane, Wash., is arranging plans and appropriation for extensions in water system in 1940, with total cost close to $962,000, principal work to include pipe line extensions and replacements, $108,865; reservoir, pumping station and warehouse, $784,000; addition to present main pumping station, $39,500. Alexander Lindsay is superintendent of department.

Buhl, Idaho, plans new 16-in. line for water system, replacing an existing wooden pipe line for main trunk service between reservoir and distribution system. Bond issue of $40,000 has been approved. Work will begin soon.

Board of Henrico County Supervisors, W. F. Day, Henrico County Court House, Twenty-second and Main Streets, Richmond, Va., county manager, asks bids until Aug. 31 for 18,300 ft. of 8-in., 56,000 ft. of 6-in., and 1000 ft. of 4-in., with valves, valve boxes, fittings, etc., for water system in Lakeside (Sanitary District No. 5). Estimated cost $150,000, including installation.

Racine Wis., water department has opened bids for $497,000 river crossing tunnel project being partly financed through WPA. Nolan Construction Co., Detroit, is low bidder with bid of $94,750 for a 9-ft. line and $78,675 for 7-ft. line. Other bidders were Centaur Construction Co., New York, $274,470 and $234,249; Underground Construction Co., Chicago, $132,483 and $123,857; United Construction Co., Green Bay, Wis., $145,500 and $138,500. Award will be made through PWA headquarters in Chicago.

Reno, Nev., asks bids Sept. 20 on 200 tons of 14-in. pipe (cast iron, cement asbestos and fusion welded steel alternates).

San Diego, Cal., has taken bids on 175 tons of 6-in. pipe.

Alhambra, Cal., has awarded 140 tons of 6-in. pipe to National Cast Iron Pipe Co., Los Angeles.

Spokane, Wash., has awarded 185 tons of 6-in. pipe to United States Pipe & Foundry Co., San Francisco.

Sacramento, Cal., has awarded 1200 ft. of 6-in sewer pipe to American Cast Iron Pipe Co., San Francisco.

. . . OBITUARY . . .

CARL LAGER

L. H. WHITESIDE

CARL LAGER, president of Morris Machine Works, Baldwinsville, N. Y., died after a long illness at his summer home in the Adirondacks on July 17, aged 70 years. On Sept. 23 he would have been able to celebrate his 50th anniversary in the employ of the Morris Machine Works, where he advanced successively as chief engineer, vice-president, general manager, and in 1935, president. Mr. Lager was born in Sweden and came to this country in 1887.

❖ ❖ ❖

LAWSON H. WHITESIDE, of the Michiana Products Corp., Michigan City, Ind., was killed in an automobile accident near Chicago on Aug. 3. Mr. Whiteside joined the Rich Tool Co., Chicago, in 1912, which company was later taken over by the Michiana Products Corp. Mr. Whiteside represented the organization as sales executive for the Chicago area for many years, and during the past four years as sales manager.

❖ ❖ ❖

JOHN R. BOOHER, for the past 17 years advertising manager, Cleveland Crane & Engineering Co., Wickliffe, Ohio, died Aug. 15, aged 61 years. Prior to affiliation with Cleveland Crane, Mr. Booher had been associated with Luetkemeyer Co., and Doubleday-Hill Electric Co., both of Pittsburgh, and with Western Electric Co., Pittsburgh and Cleveland and Cuyahoga Power & Construction Co., Cleveland.

❖ ❖ ❖

ERIC P. BARFIELD, chairman and managing director of Wild-Barfield Electric Furnaces, Ltd., North Road, London, England, died on Aug. 7 after a short illness.

❖ ❖ ❖

EZEKIEL VAN NOORDEN, who died in Florida Aug. 6, and was buried in Boston Aug. 12, was one of Boston's largest sheet metal fabricators. He was born in Detroit 91 years ago, and went to Boston in 1873 where he established the E. Van Noorden Co.

❖ ❖ ❖

GEORGE A. TABER, who for 40 years owned and operated the National Foundry Supply Co., Boston, died at his home in Quincy, Mass., on Aug. 15. He retired from business six years ago. Mr. Taber was born in New Bedford, Mass., 74 years ago.

❖ ❖ ❖

CHARLES C. WOLFORD, 57, superintendent of the Felins Tying Machine Co., Milwaukee, for 18 years, died at a Milwaukee hospital Aug. 12, following an illness of about a week. Before joining Felins, Mr. Wolford had been associated with the Harley-Davidson Motor Co., for 13 years.

B-G-R

Delicate responsiveness to the slightest pressure . . . or carrying capacities of thousands of pounds...it's all in the day's work for B-G-R Springmakers. A Scientific Knowledge of materials, manufacture and heat-treating gives good results. Economy and satisfactory performance follow as a matter of course.

Let B-G-R analyze your next spring action.

SPRINGS
SMALL STAMPINGS
WIRE FORMS

BARNES-GIBSON-RAYMOND

DETROIT PLANT DETROIT, MICHIGAN ← TWO PLANTS → ANN ARBOR PLANT ANN ARBOR, MICHIGAN

Current Metal Working Activity

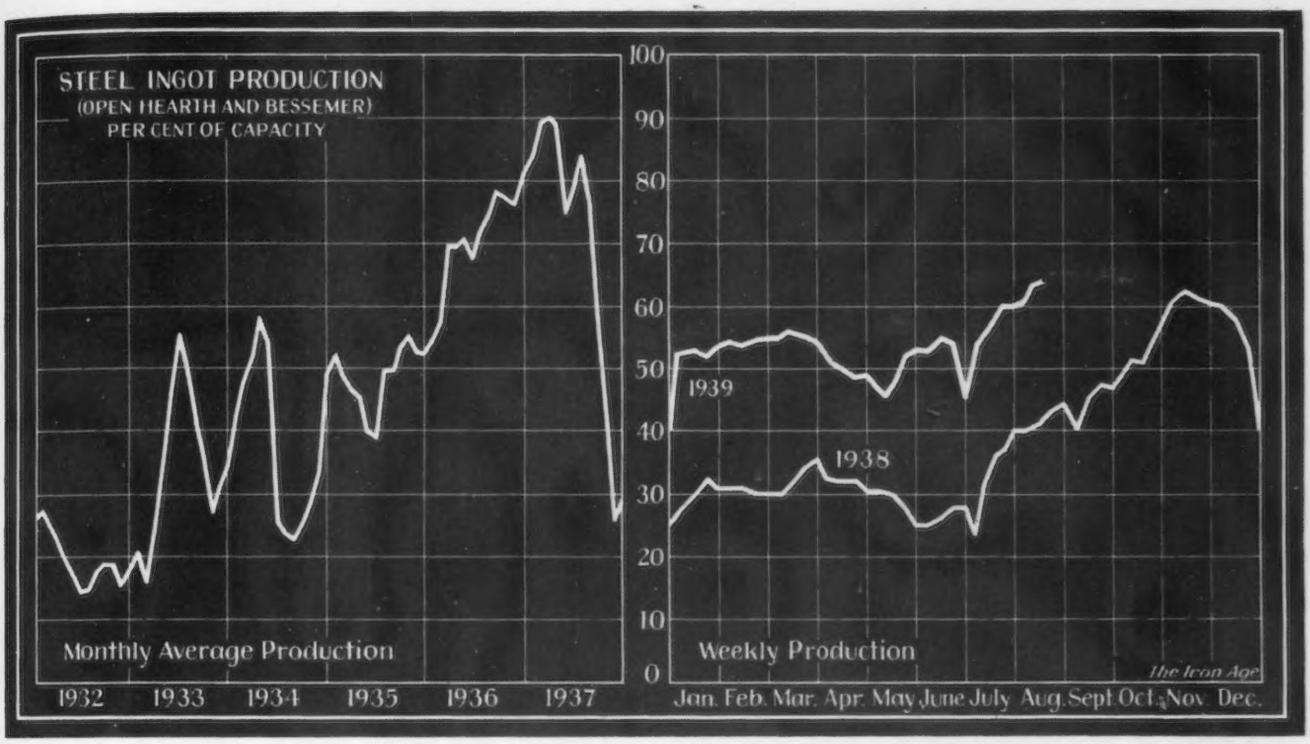
Latest Data Assembled by THE IRON AGE from Recognized Sources

	July 1939	June 1939	July 1938	Seven Months 1939	Seven Months 1938
Steel Ingots: (gross tons)					
Monthly output[a]	3,288,949	3,125,288	1,974,317	21,879,729	12,762,900
Average weekly output[a]	744,106	728,505	446,678	722,341	421,357
Per cent of capacity[a]	54.50	53.35	33.29	52.90	31.40
Pig Iron: (gross tons)					
Monthly output[b]	2,356,270	2,118,451	1,201,785	14,878,639	9,074,811
Raw Materials:					
Coke output[c] (net tons)	.....	.....	2,220,212	.....	17,440,658
Lake ore consumed[d] (gross tons)	.....	2,829,667	1,674,721	*16,970,886*	12,391,008
Scrap iron and steel consumed	2,551,115	2,428,121	1,519,759	17,001,670	9,822,632
Castings: (net tons)					
Malleable, orders[e]	.....	29,041	16,905	*193,262*	129,525
Steel orders[e]	.....	.....	36,641	.....	188,711
Finished Steel: (net tons)					
Trackwork shipments[a]	5,330	6,832	2,395	25,639	12,681
Fabricated shape orders[f]	.....	109,267	96,013	*662,631*	586,113
Fabricated plate orders[e]	.....	33,959	27,773	*177,037*	174,217
U. S. Steel Corp. shipments[g]	676,309	733,433	441,570	5,069,575	3,451,924
Fabricated Products:					
Automobile production[h]	218,420*	321,000*	150,444	2,265,708*	1,456,476
Steel furniture orders[e]	.....	$1,902,005	$1,480,002	*$10,847,257*	$11,580,002
Steel boiler orders[e] (sq. ft.)	.....	1,032,339	691,371	*5,239,093*	4,123,313
Locomotives ordered[i]	4	8	3	156	78
Freight cars ordered[i]	0	1,324	0	9,077	8,024
Machine tool index[j]	230.9	211.6	89.6	220.8†	75.5†
Foundry equipment index[k]	**111.9**	134.6	74.2	118.6†	76.0†
Non-ferrous Metals: (net tons, U. S. only)					
Lead shipments[l]	.....	38,898	40,409	*232,406*	222,617
Lead stocks[l]	.....	129,366	155,631	.....	.....
Zinc shipments[m]	43,128	37,284	33,825	288,418	189,063
Zinc stocks[m]	131,782	135,241	146,208	.....	.....
Tin deliveries[n] (gross tons)	.....	4,925	4,205	*30,000*	30,525
Refined copper deliveries[o]	75,808	63,862	54,597	411,660	281,488
Refined copper stocks[o]	316,543	335,012	339,970	.....	.....
Exports: (gross tons)					
Total iron and steel[p]	.....	588,856	263,699	*2,712,227*	3,179,378
All rolled and finished steel[p]	.....	159,188	100,671	*782,693*	821,037
Semi-finished steel[p]	.....	13,227	20,197	*710,012*	167,099
Scrap[p]	.....	397,321	125,399	*1,776,015*	1,910,771
Imports: (gross tons)					
Total iron and steel[p]	.....	32,587	14,728	*176,994*	133,713
Pig iron[p]	.....	4,276	936	*15,854*	21,301
All rolled and finished steel[p]	.....	16,050	11,130	*105,411*	92,620
British Production: (gross tons)					
Pig iron[q]	743,600	717,700	507,800	4,382,300	4,513,200
Steel ingots[q]	1,153,100	1,175,600	683,200	7,558,000	6,609,700

† Three months' average. * Preliminary. *Figures in italics are six months' totals.*

Source of data: [a] American Iron and Steel Institute; [b] THE IRON AGE; [c] Bureau of Mines; [d] Lake Superior Iron Ore Association; [e] Bureau of the Census; [f] American Institute of Steel Construction; [g] United States Steel Corp.; [h] Preliminary figures from Ward's Automotive Reports—Final figures from Bureau of the Census, U. S. and Canada; [i] *Railway Age;* [j] National Machine Tool Builders Association; [k] Foundry Equipment Manufacturers Association; [l] American Bureau of Metal Statistics; [m] American Zinc Institute; [n] New York Commodity Exchange; [o] Copper Institute; [p] Department of Commerce; [q] British Iron and Steel Federation.

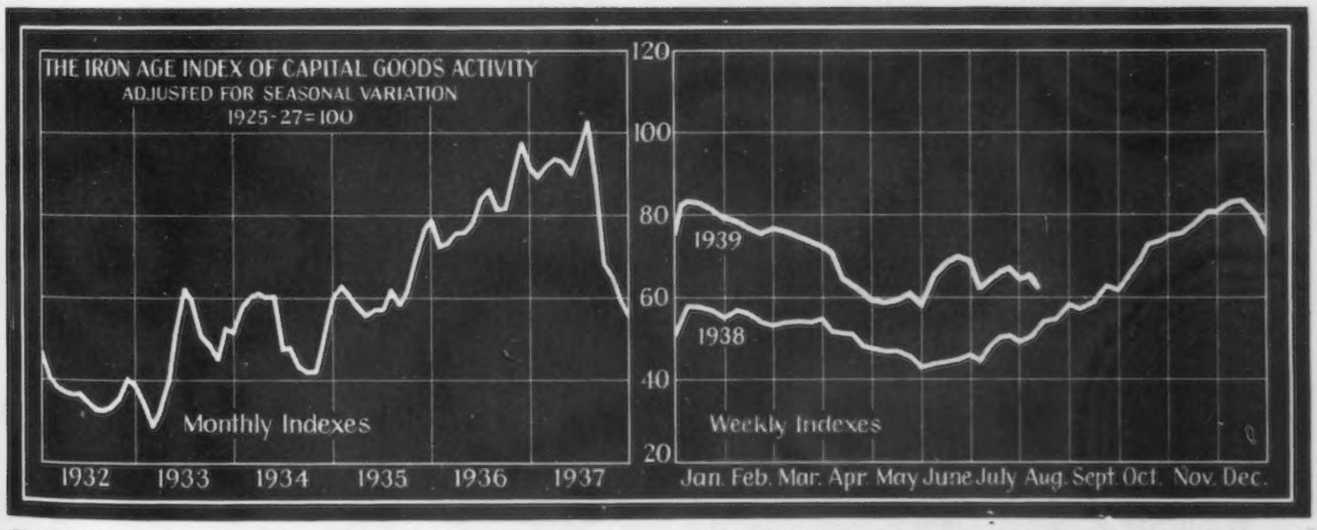
Ingot Output at 63% Passes 1938 Peak



District Ingot Production, Per Cent of Capacity	Pitts-burgh	Chicago	Valleys	Phila-delphia	Cleve-land	Buffalo	Wheel-ing	Detroit	S. Ohio Southern	S. Ohio River	Western	St. Louis	East-ern	Aggre-gate
CURRENT WEEK..	56.0	56.5	58.0	48.0	78.0	61.0	80.0	82.5	78.0	62.5	54.0	60.0	75.0	**63.0**
PREVIOUS WEEK..	57.0	58.0	54.0	48.0*	81.0	59.0	80.0	79.3	75.0	58.0	54.0	60.0	75.0	**62.5**

* Revised.

Ending of Auto Model Year Forces Index Down to 63.2



THE sharp drop in automobile assemblies in the past week as the bottom of the change-over period was reached forced THE IRON AGE index of capital goods activity down 1.9 points to 63.2, the lowest since the week of July 8. Moderate counterseasonal gains were registered by several components of the index, notably steel output and heavy construction, but these advances were not large enough to overcome the drop in the automobile factor from 32.7 two weeks ago to 19.6 in the past week. The improvement in the construction index was due primarily to the week's unusually high volume of industrial building awards. On a dollar basis, these awards were 42 per cent over the preceding week and 176 per cent over the 1938 week. Both industrial activity and originating shipments in the Pittsburgh area showed an increase in the past two weeks.

	Week Ended Aug. 19	Week Ended Aug. 12	Comparable Week 1938	Comparable Week 1929
Steel ingot production[1]	92.1	88.3	58.3	127.1
Automobile production[2]	19.6	32.7	40.0	117.4
Construction contracts[3]	69.8	68.6	66.3	111.1
Forest products carloadings[4]	56.8	59.0	53.2	119.5
Production and shipments, Pittsburgh District[5]	77.8	77.0	52.0	126.8
Combined index	**63.2**	**65.1**	**54.0**	**120.4**

Sources: 1. THE IRON AGE; 2. Ward's Automotive Reports; 3. *Engineering News-Record*; 4. Association of American Railroads; 5. University of Pittsburgh.

. . . SUMMARY OF THE WEEK . . .

. . . Steel output reaches 63 per cent, highest rate since 1937.

o o o

. . . August business so far above July despite war fears abroad.

o o o

. . . Prices show increasing firmness; structural awards increase.

STEEL production this week has advanced another half point to 63 per cent of capacity on a mill schedule which, for the industry as a whole, is the strongest for any week since Oct. 12, 1937. Five out of the eight leading steel-producing areas report moderate gains in activity, the remaining three showing narrow losses, and the volume of new business is, for most companies, running from 5 to 15 per cent ahead of July.

How far the current advance in steel production will go is uncertain partly because the extent to which fears of a new world war will affect buying over the next few weeks cannot be measured in advance. Nevertheless the steel industry finds distinct bright spots in the domestic picture. Miscellaneous steel buying continues to improve, consumers' stocks are low, and in most districts production is not running ahead of shipments. Perhaps the most important development continues to be growing price firmness, which is emphasized this week by a revision upward of bending and engineering extras on reinforcing bar projects, and an alteration by alloy steel producers of their lists of hot rolled products extras.

A SIGNIFICANT gain in steel ingot production took place at Detroit where output rose to 82½ per cent from 79 per cent last week. Youngstown operations have gained four points to 58 per cent, Buffalo two points to 61 per cent, the South three points to 78 per cent and the southern Ohio River area 4½ points to 62½ per cent. The Pittsburgh district declined a point to 56 per cent and the Chicago area dipped a point and a half to 56½ per cent, with Cleveland going down three points to 78 per cent.

The industry's average rate of 63 per cent this week compares with the 1938 peak operating rate of 62½ per cent, reached in the week of Nov. 15, and with the high for 1937 of above 90 per cent. Meanwhile the current operating rate is being supported by demand from a wide range of consumers such as stove and washing machine manufacturers and barrel makers. Heavier automotive releases are expected to sustain August steel bookings in comparison with July and producers in many districts look for a distinct improvement in shipments to Detroit after Labor Day. Meanwhile the drop in automobile assemblies to the lowest level of the year depressed THE IRON AGE capital goods index by 1.9 points to 63.2.

THE Union Pacific railroad in the next eight months will build two new 17-car streamlined trains costing $2,500,000 each while the North Western's proposed 800 cars, the major railroad construction program pending, are likely to call for bids shortly.

Structural steel lettings the past week advanced to 16,450 tons from 10,745 tons last week, the largest awards being 2410 tons for a hospital building at the Medical Center, Jersey City; 1728 tons at Pollock, Cal., for the Salt Creek bridge; 1035 tons for a bridge at Avondale, La., and 1000 tons for a grade elimination project at Grand Blanc, Mich.

NEW structural projects at 16,900 tons are equal to last week's volume and include 3000 tons for a New York apartment building, 2000 tons for a ramp extension to the Main Avenue bridge, Cleveland, 1700 tons for a shipways extension at the New York Navy Yard, and several other sizable projects. Reinforcing steel awards total 6610 tons and include 1250 tons for a housing project at Pittsburgh.

Lake Superior iron ore shipments this month are expected to be the largest since September, 1937, judging from the increase in ore-hauling vessels on the Lakes.

Although supplies of scrap are tight in most markets, sales have been at recently published prices and THE IRON AGE scrap composite remains unchanged at $15.46 a ton. July scrap consumption is estimated at 68 per cent above the like month of 1938.

A Comparison of Prices

Market Prices at Date, and One Week, One Month, and One Year Previous
Advances Over Past Week in Heavy Type, Declines in Italics

Rails and Semi-finished Steel

Per Gross Ton:	Aug. 22, 1939	Aug. 15, 1939	July 25, 1939	Aug. 23, *1938
Rails, heavy, at mill	$40.00	$40.00	$40.00	$42.50
Light rails: Pittsburgh, Chicago, Birmingham	40.00	40.00	40.00	40.00
Rerolling billets: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point	34.00	34.00	34.00	34.00
Sheet bars: Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point	34.00	34.00	34.00	34.00
Slabs: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point	34.00	34.00	34.00	34.00
Forging billets: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham	40.00	40.00	40.00	40.00
Wire rods: Nos. 4 and 5, Pittsburgh, Chicago, Cleveland	43.00	43.00	43.00	43.00
Skelp, grvd. steel, Pittsburgh, Chicago, Youngstown, Coatesville, Sparrows Point, cents per lb.	1.90	1.90	1.90	1.90

Finished Steel

Cents Per Lb.:	Aug. 22, 1939	Aug. 15, 1939	July 25, 1939	Aug. 23, *1938
Bars, Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham	2.15	2.15	2.15	2.25
Plates, Pittsburgh, Chicago, Gary, Birmingham, Sparrows Point, Cleveland, Youngstown, Coatesville, Claymont	2.10	2.10	2.10	2.10
Structural shapes, Pittsburgh, Chicago, Gary, Buffalo, Bethlehem, Birmingham	2.10	2.10	2.10	2.10
Cold finished bars: Pittsburgh, Buffalo, Cleveland, Chicago, Gary	2.65	2.65	2.65	2.70
Alloy bars: Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton	2.70	2.70	2.70	2.80
Hot rolled strip: Pittsburgh, Chicago, Gary, Cleveland, Middletown, Youngstown, Birmingham	2.00	2.00	2.00	2.15
Cold rolled strip: Pittsburgh, Cleveland, Youngstown	2.80	2.80	2.80	2.95
Sheets, galv., No. 24: Pittsburgh, Gary, Sparrows Point, Buffalo, Middletown, Youngstown, Birmingham	3.50	3.50	3.50	3.50
Hot rolled sheets: Pittsburgh, Gary, Birmingham, Buffalo, Sparrows Point, Cleveland, Youngstown, Middletown,	2.00	2.00	2.00	2.15
Cold rolled sheets: Pittsburgh, Gary, Buffalo, Youngstown, Cleveland, Middletown	3.05	3.05	3.05	3.20
Wire nails: Pittsburgh, Chicago, Cleveland, Birmingham	2.40	2.40	2.40	2.45
Plain wire: Pittsburgh, Chicago, Cleveland, Birmingham	2.60	2.60	2.60	2.60
Barbed wire, galv.: Pittsburgh, Chicago, Cleveland, Birmingham	†3.25	3.25	3.25	3.20
Tin plate, 100 lb. base box: Pittsburgh and Gary	$5.00	$5.00	$5.00	‡$5.35

*Pittsburgh prices only.
†Applies to 80-rod spools only.
‡Subject to post-season adjustment.

Pig Iron

Per Gross Ton:	Aug. 22, 1939	Aug. 15, 1939	July 25, 1939	Aug. 23, *1938
No. 2 fdy., Philadelphia	$22.84	$22.84	$22.84	$21.84
No. 2, Valley furnace	21.00	21.00	21.00	20.00
No. 2, Southern Cin'ti	21.06	21.06	21.06	20.06
No. 2, Birmingham	17.38	17.38	17.38	16.38
No. 2, foundry, Chicago†	21.00	21.00	21.00	20.00
Basic, del'd eastern Pa.	22.34	22.34	22.34	21.34
Basic, Valley furnace	20.50	20.50	20.50	19.50
Malleable, Chicago†	21.00	21.00	21.00	20.00
Malleable, Valley	21.00	21.00	21.00	20.00
L. S. charcoal, Chicago	28.34	28.34	28.34	28.34
Ferromanganese, seab'd carlots	80.00	80.00	80.00	92.50

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

Scrap

Per Gross Ton:	Aug. 22, 1939	Aug. 15, 1939	July 25, 1939	Aug. 23, *1938
Heavy melting steel, P'gh.	$16.25	$16.25	$15.75	$15.50
Heavy melting steel, Phila.	16.25	16.25	15.75	14.25
Heavy melting steel, Ch'go.	13.875	13.875	13.875	13.75
Carwheels, Chicago	12.75	12.75	12.75	14.25
Carwheels, Philadelphia	16.25	16.25	16.00	17.25
No. 1 cast, Pittsburgh	15.75	15.75	15.25	15.25
No. 1 cast, Philadelphia	16.75	16.75	16.75	16.25
No. 1 cast, Ch'go (net ton)	12.75	12.75	12.75	13.25

Coke, Connellsville

Per Net Ton at Oven:	Aug. 22, 1939	Aug. 15, 1939	July 25, 1939	Aug. 23, *1938
Furnace coke, prompt	$3.75	$3.75	$3.75	$3.75
Foundry coke, prompt	4.75	4.75	4.75	4.75

Non-Ferrous Metals

Cents per Lb. to Large Buyers:	Aug. 22, 1939	Aug. 15, 1939	July 25, 1939	Aug. 23, *1938
Copper, Electrolytic, Conn.	10.50	10.50	10.31	10.125
Copper, Lake, New York	10.50	10.50	10.375	10.25
Tin (Straits), New York	48.65	48.75	48.45	42.875
Zinc, East St. Louis	4.75	4.75	4.60	4.75
Zinc, New York	5.14	5.14	4.99	5.14
Lead, St. Louis	4.90	4.90	4.70	4.75
Lead, New York	5.05	5.05	4.85	4.90
Antimony (Asiatic), N. Y.	14.00	14.00	14.00	14.00

On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

The Iron Age Composite Prices

	Finished Steel	Pig Iron	Steel Scrap
Aug. 22, 1939	2.236c. a Lb.	$20.61 a Gross Ton	$15.46 a Gross Ton
One week ago	2.236	20.61	15.46
One month ago	2.236	20.61	15.13
One year ago	2.300	19.61	14.50

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strip. These products represent 85 per cent of the United States output.

Based on average for basic iron at Valley furnace and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	Finished Steel High	Finished Steel Low	Pig Iron High	Pig Iron Low	Steel Scrap High	Steel Scrap Low
1939	2.286c., Jan. 3	2.236c., May 16			$15.46, Aug. 15	$14.08, May 16
1938	2.512c., May 17	2.211c., Oct. 18	$23.25, June 21	$19.61, July 6	15.00, Nov. 22	11.00, June 7
1937	2.512c., Mar. 9	2.249c., Jan. 4	23.25, Mar. 9	20.25, Feb. 16	21.92, Mar. 30	12.92, Nov. 10
1936	2.249c., Dec. 28	2.016c., Mar. 10	19.73, Nov. 24	18.73, Aug. 11	17.75, Dec. 21	12.67, June 9
1935	2.062c., Oct. 1	2.056c., Jan. 8	18.84, Nov. 5	17.83, May 14	13.42, Dec. 10	10.33, Apr. 29
1934	2.118c., Apr. 24	1.945c., Jan. 2	17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25
1933	1.953c., Oct. 3	1.792c., May 2	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
1932	1.915c., Sept. 6	1.870c., Mar. 15	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.43, July 5
1931	1.981c., Jan. 13	1.883c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930	2.192c., Jan. 7	1.962c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.223c., Apr. 2	2.192c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3
1928	2.192c., Dec. 11	2.142c., July 10	18.59, Nov. 27	17.04, July 24	16.50, Dec. 31	13.08, July 9

. . . THIS WEEK'S MARKET NEWS . . .

PRICES

. . . Quotations stiffen; alloy bar extras revised

THE steel price structure is becoming stiffer and discloses more strength than has been apparent for a considerable number of months. Steel producers have their eye on cost factors and have already revised selling practices which have resulted in losses. Some concrete bar fabricators have boosted bending charges $2 a ton and have put into effect what will result in a net increase in charges for engineering work involving reinforcing bar projects. Details are under "Reinforcing Bars."

Because of increased handling costs, and because a study of the situation indicates an uneconomic price structure, some alloy steel producers have revised their list of hot rolled products, extras and deductions, the new changes to become effective Oct. 1. Quantity extras have been revised as follows:

20 tons and over, base price
Under 20 tons to 10 tons inclusive, 5c. a 100 lb.
Under 10 tons to 5 tons inc., 10c. a 100 lb.
Under 5 tons to 3 tons inc., 15c. a 100 lb.
Under 3 tons to 2 tons inc., 20c. a 100 lb.
Under 2 tons to 1 ton inc., 35c. a 100 lb.
Under 1 ton, prices on application.

The present base on quantity extras which will apply until the end of this quarter is 3 tons and over, there being a 10c. a 100 lb. extra on quantities under 3 tons to 2 tons inclusive, and 25c. a 100 lb. extra on quantities under 2 tons to 1 ton inclusive.

A substantial revision has also been made in size extras on hot rolled alloy bars and the changes are identical with those made recently on the hot rolled carbon bar card. The major revisions involve sizes between 47/64 and 4 9/16 in. The new base applies on sizes from 47/64 to 1½ in. whereas the present base, which applies to the end of this quarter covers 47/64 in. to 3 1/16 in. Net increases will result from the new revisions because of a contraction in the range of sizes taking certain extras.

Revisions have also been made in the chemical extra list, involving chiefly copper and sulphur content and a few changes have been made in extras for alloy content.

Size extras on blooms, billets and slabs have been revised so that there will be applicable on fourth quarter business a $10 a ton extra on sizes ranging from 4 x 4 up to but not including 7 x 7 in. whereas 7 x 7 up to but not including 10 x 10 in. blooms, billets and slabs will take the base price. Under the setup previous to revision, the base price applies on 4 x 4 in. up to but not including 10 x 10.

Certain changes have also been made in treatment and finish extras, a 75c. a 100 lb. extra being added for stress relieving and $1.50 a 100 lb. extra for heat treating lengths up to a maximum of 30 ft. Other minor changes throughout the extra card have also been made.

NEW BUSINESS

. . . Releases to date 8 to 15% above comparable July period

GENERAL volume of steel specifications is running from 8 to 15 per cent ahead of a month ago. Current steel specifications at PITTSBURGH remain widely diversified and have received additional support in the past few days from automobile manufacturers and parts makers. This slight upward movement in the flow of automotive specifications presages a further increased volume of business from these sources. Although actual structural awards are not as abundant as a month ago, structural specifications against previously awarded projects are running as much as 10 per cent ahead of July. Hot rolled bar bookings are increasing and the volume is moderately ahead of both last week and the corresponding period in July. A pipe line order was placed recently by a Socony-Vacuum subsidiary involving about 11,000 tons of various sized pipe ranging from 2 to 8 in., the order being divided among four producers.

Broadening demand from the automotive industry for steel and parts is noted around CLEVELAND, where aggregate steel orders up to Aug. 20 were around 8 per cent ahead of the same period of July. Heavier automotive releases are expected soon and are counted upon to sustain this month in comparison to July. Shipments also are showing improvement over July.

Stove and washing machine manufacturers, and barrel makers are more active in northern Ohio. The Government corn crib program is assisting galvanized sheet sales. Railroad car parts have been moving moderately well.

Lake Superior iron ore shipments this month appear likely to be largest since September, 1937, judging from the increase in vessels on the Great Lakes.

The Healy Subway Construction Corp., which last week made the low bid on section D1 of the Chicago subway, is also the low bidder on section S3 involving 28,000 tons of liner plates and rib beams, 1900 tons of structural shapes, 3750 tons of reinforcing steel, 540 tons of sheet piling and 395 tons of cast iron. Section D1 will require about 23,000 tons of steel.

Bookings so far in August are running behind July for some NEW YORK district sales offices while sales in PHILADELPHIA as a whole continue to hold below the July level. The decline is fairly general, but particularly noticeable is decrease in shipments of tin plate and sheets.

STEEL OPERATIONS

. . . Production gains to 63%, highest since October, 1937

INGOT production this week at 63 per cent has established a new peak for this year which exceeds the best operating rate of last year—62½ per cent in November—and reflects the strongest mill schedule since Oct. 12, 1937, when the industry's operating average was at 63.5 per cent.

Five districts report a gain this week in operations, three districts including Pittsburgh and Chicago show narrow declines and the other steel-producing

areas find production unchanged from last week.

Ingot output in the PITTSBURGH district has eased off fractionally to 56 per cent of capacity, down one point from a week ago. The drop is not considered significant. WHEELING-WEIRTON rate remains unchanged this week at 80 per cent of capacity while the rate for YOUNGSTOWN and nearby cities this week is up four points to 58 per cent. The schedule for CLEVELAND-LORAIN is down three points to 78 per cent.

CHICAGO district mills are operating this week at 56½ per cent of capacity, down 1½ points from last week and Buffalo output has climbed to 60 per cent.

At DETROIT the ingot rate is 82½ per cent, the increase from last week attributable to the addition of one furnace at Ford Motor Co. which now has seven furnaces in operation. Ford intends to go to nine (possibly ten) furnaces next week.

Steel production in the Cincinnati area increased still further during the past week, with the addition of another furnace at the Middletown unit of American Rolling Mill Co. Output is now averaging approximately 63 per cent of capacity.

PIG IRON

. . . Shipments at some points ahead of July

WITH foundries which make miscellaneous automotive castings becoming more active, shipments of CLEVELAND and YOUNGSTOWN pig iron producers are holding up well, slightly ahead of July to date. Activity of the jobbing foundry field remains sporadic. Practically all sales at CLEVELAND and YOUNGSTOWN are spot. Shipments are desired in a comparatively few hours, clearly indicating the low state of consumer inventories. Export inquiry is described as "picking up."

New pig iron business at PITTSBURGH has been in substantially the same volume as a week ago. Specifications and releases, if anything, are running slightly ahead of the corresponding period of last month while shipments thus far in the NEW YORK district are ahead of July and new business, though still on a spot basis, is in somewhat greater volume. The market is definitely firmer here, buoyed up by rising scrap prices. Some of the larger consumers are showing signs of interest and are feeling out the market. No sales have been made for delivery beyond the end of the quarter, however, and no price rise is considered imminent.

Meanwhile in the SOUTH the market appears to be a little better. Shipments are steady at about the same rate as for July. Some new tonnage is being booked, as old contracts become exhausted. Local producers are encouraged.

At BOSTON, a further slight improvement in the number of one, two and three carlot orders is reported by furnace representatives, as well as a more diversified range of silicons, etc. Also an occasional 100-ton lot was sold, but aggregate bookings are still comparatively small. With the improvement in pig iron sales has come a slight betterment in the weekly aggregate melt, now estimated by furnace representatives as fully 50 per cent and probably 55 per cent of capacity.

Specifications against pig iron contracts at CINCINNATI continue at better than seasonal rate, largely under the stimulus of reports that furnace interests will not rewrite present "cheap" contracts written earlier in the year. Melters seem to be fairly determined in their desire to take out all this iron they have under order before the close of the quarter. Foundry operations continue at a good rate with a definite optimistic feeling among automotive melters for an early expansion in their demand.

Shipments in PHILADELPHIA are just about maintaining the July pace, but sellers are optimistic of future outlook. Consumers' inventories are very low and new buying is still limited to immediate needs.

Shipments both of pig iron and foundry coke are well ahead of a month ago in the CHICAGO area and from all indications this increase will be continued through September and October.

IRON ORE

SHIPMENTS of Lake Superior iron ore this month appear likely to be heaviest since September, 1937, and ahead of the 6,309,938 gross tons carried last month. This deduction arises from the monthly vessel report of C. C. Lindeman, statistician for the M. A. Hanna Co., Cleveland, which shows that from July 15 to Aug. 15 the number of American freighters in the ore trade increased from 180 to 206. On Aug. 15, 1938, only 96 vessels were engaged in the ore trade.

The monthly ore consumption report of the Lake Superior Iron Ore Association, Cleveland, shows 3,143,337 gross tons used by furnaces in July against 2,829,667 tons consumed in June and 1,674,721 tons used in July, 1938. Up to Aug. 1, this year, consumption totaled 20,114,223 tons against 12,341,008 in the comparable period last year.

Ore on hand at furnaces and Lake Erie docks Aug. 1 totaled 28,507,243 tons against 25,861,237 tons on July 1 and 35,846,160 tons on Aug. 1, 1938. There were 102 furnaces in blast July 31 against 90 at the last report and 59 on the same date one year ago.

SHEETS AND STRIP

. . . Signs of tightness in deliveries seen by some producers

TOTAL sheet specifications at PITTSBURGH so far this month are from 20 to 25 per cent greater than the volume booked at this time a month ago. Although releases from automotive centers have picked up in the past few days, the bulk of the improvement this month can still be attributed to a widely diversified miscellaneous demand. The volume of specifications is also up moderately from a week ago with indications already present that the improvement will continue because of automotive support.

Hot and cold rolled strip bookings at PITTSBURGH have not expanded as much as sheets so far this month compared with a month ago but specifications in the past week, however, were from 15 to 25 per cent greater in tonnage than a week ago. The belief is growing stronger that sheet deliveries will be affected to some extent when the major influx of automobile business starts to reach the mills. Some consumers used to relatively prompt delivery because of slack demand over the past year, are finding it necessary to anticipate their needs more in advance than they have been accustomed to.

At CLEVELAND orders entered on mill books up to Aug. 21 exceeded the corresponding July period by a few thousand tons. Heavier automotive specifications are anticipated soon and if they materialize will provide a greater margin of improvement over July. Sizable inventories of partially finished automotive sheets are held by some mills to expedite shipments which will be desired in a matter of hours when the releases come through. CLEVELAND also reports that barrel makers are more active and are nearing the alcohol drum season with good

prospects of business. The Government corn crib program is creating fair activity in the galvanized sheet market.

In the CHICAGO district specifications against May bargain commitments are being requested no later than Sept. 15 by mills for shipment as soon thereafter as possible, thus indicating that a runover into October is expected on delivery of these cheap sheets. This deadline applies to general consumers only, automobile accounts being covered practically solid for the entire year. Automobile releases are being received in fairly good volume, but not yet at what could be called a high rate. General Motors is not expected to be productive of heavy demand until around Labor Day.

Miscellaneous consumers in the PHILADELPHIA district are releasing low price tonnages at a fairly high rate, but it is still doubtful that mills will dispose of all low priced bookings before the end of this month as planned. Specifications from auto parts plants have been very light, but better volume is looked for within next week or so.

A rush of orders for small lots of sheet steel, during the past week, pushed the new business average at CINCINNATI up to almost 80 per cent of the market capacity. Automotive ordering accounts for large portion of the improvement, but miscellaneous users for twenty-five to fifty ton lots were most frequent in the current business. Galvanized sheets continue to reflect a good demand.

PLATES

. . . Volume so far in August shows improvement

PLATE volume in the NEW YORK district has improved somewhat thus far in August over the comparable July period. Structural fabricators have been responsible for a good part of the business. Prices have firmed up considerably since the first of July. At CLEVELAND orders so far this month are holding up well in comparison to July.

Current plate mill operations in EASTERN PENNSYLVANIA are supported mainly by government work. Shipyards, still the most promising outlet for future business, are at present placing very little new business, despite high rate of operations. Railroads are still out of the market. Prices are definitely harder than for some time past, but on certain business small concessions persist.

WIRE PRODUCTS

AGGREGATE orders at CLEVELAND to date this month are around 10 per cent ahead of July. Manufacturers and rod sales are largely responsible for the gains but merchant orders are holding up better than anticipated. From all indications farm buying will be well maintained over the next few months.

Total wire specifications at PITTSBURGH are up slightly from a week ago owing to improved manufacturers' wire demand. A small pick-up in orders of this type from automobile and parts makers has been noted. Merchant wire specifications are relatively slow but shipments are holding at recent levels. Wire producers are actually welcoming the slowing up in new merchant wire business in order to replenish badly depleted stocks.

STRUCTURAL STEEL

. . . Specifications continue to run ahead of July

AWARDS were somewhat more numerous the past week, the largest being 2410 tons to Bethlehem Steel Co. for a hospital building at the Jersey City medical center. Other contracts placed included 1728 tons to American Bridge Co. for the Salt Creek bridge, Pollock, Cal., 1035 tons to Jones & Laughlin Steel Corp. for a bridge at Avondale, Cal., and 1000 tons to American Bridge for a grade separation bridge at Grand Blanc, Mich.

Although structural specifications at PITTSBURGH declined in the aggregate this week, bookings so far this month are running from 8 to 10 per cent ahead of a month ago. While the volume of structural business during the balance of the year is not expected to be as great as earlier in the year, producers do not expect any sharp drop in the total volume of fresh orders. Particularly interesting to fabricators is the substantial increase in the number of private jobs appearing recently. Although tonnages on these projects are not necessarily heavy, it is believed that private enterprise to some extent will take up some of the slack caused by completion of publicly financed jobs. This week, for instance, new inquiries include tonnages for three public utility companies, which may be a forerunner of construction of this type which has been absent from the market for some time.

Pending jobs include 3000 tons for a New York apartment building, 1700 tons for an extension to shipways, Brooklyn Navy Yard, 1400 tons for a viaduct at Providence, R. I., 1300 tons for an extension to the Potomac Electric Co.'s Buzzard Point plant at Washington, and 2000 tons for a ramp extension to the Main Avenue bridge, Cleveland.

RAILROAD BUYING

. . . Buying of carrier equipment continues light

DEMAND for railroad cars and locomotives is unchanged. Tennessee Coal, Iron & Railroad Co. has ordered 49 ore cars from Pullman-Standard Car Mfg. Co.; Maine Central has placed an order for two diesel-electric switching locomotives with American Locomotive Co., and Navy Department has ordered one diesel-electric locomotive from Atlas Car & Mfg. Co.

New inquiries include seven electric locomotives for Chilean State Railways, one or two box cars for the Navy Department and two streamlined rail-motor cars for New York, Susquehanna & Western. Application to Federal Court to purchase last mentioned equipment has been made by Susquehanna, but has not yet been acted upon by the court.

The a.c.f. Motors Company has received orders for eleven a.c.f. motor coaches powered with the Hall-Scott horizontal engine: six for A. B. & W. Transit Co., Alexandria, Va.; and five for United Electric Railways Co., Providence, R. I. The J. G. Brill Co. has received an order from The Wilkes-Barre Railway Corp., Wilkes-Barre, Pa., for nine single-motor 40-passenger Brill trolley coaches.

Class I railroads in the first seven months of 1939 put in service 10,302 new freight cars, the Association of American Railroads announces. In the same period last year Class I railroads put 6927 in service.

New steam locomotives put in service in the first seven months of 1939 totaled 20 compared with 136 in the same period of 1938. New electric and diesel locomotives installed in the seven months' period this year totaled 119 compared with 82 in the same period last year.

Class I railroads on August 1 had 8473 new freight cars on order, compared with 10,234 on the same day last year, and 10,062 on July 1, 1939.

New steam locomotives on order on Aug. 1, 1939, totaled 72, compared with 26 on Aug. 1 last year, and 60 on July 1, 1939. New electric and diesel locomotives on order on Aug. 1 this year numbered 46 compared with 23 one year ago and 48 on July 1. 1939.

The Union Pacific during the next eight months will build two new 17-car streamlined trains costing $2,500,000 each for the Chicago-Pacific Coast run.

The North Western's proposed 800 cars constitute the major construction program pending. It is understood that plans and bid invitations are ready for mailing to car builders and are awaiting only management's go ahead signal.

MERCHANT BARS

. . . Specifications gain 25% at Pittsburgh

HOT rolled bar sales at PITTSBURGH continued to expand in the past week, in some cases the volume of specifications being as much as 25 per cent better than a week ago. Orders so far this month are also running moderately ahead of a month ago and this trend is expected to continue over the balance of the month. The type of business being booked remains widely diversified but automobile manufacturers and parts makers are also specifying more freely.

Some automobile parts makers in the CHICAGO district are getting in orders from Detroit for 1940 models but the greater part of this demand is yet to come. Releases from General Motors are not expected until around Labor Day, so it is probable that local plants supplying parts for General Motors products will become busier soon, and continue so throughout September and October at least. Orders from farm implement manufacturers are still fairly light.

Sales at CLEVELAND are on an even keel, the month's total to date being comparable to the corresponding part of last month. Of all the bar markets, principal interest this week centers upon alloy grades where new extra lists are being issued.

Sales to jobbers, forgers and miscellaneous consumers in PHILADELPHIA are holding up well. Warehouses are strenuously protesting recent revisions in hot rolled bar extras while mills insist they are standing firm.

REINFORCING BARS

. . . Pittsburgh housing project tonnage to Truscon

REINFORCING bar awards have increased over the past few weeks at some points, the latest sizable contract being 1250 tons for a Pittsburgh housing project, going to Truscon Steel Co. Pending projects include 3500 tons for a section of the Pennsylvania Turnpike, 2380 tons for a government housing project in Boston and 1000 tons for a Lit Bros. warehouse at Philadelphia.

Concrete bar prices appear to be holding firm at the new quoted price of $1.90 a 100 lb. f.o.b. Pittsburgh for new billet steel bars. Some fabricators are revising upward the bending and engineering extras on reinforcing bar projects. One fabricator is now charging $8 a ton for heavy bending and $18 a ton for light bending as against $6 and $16 a ton formerly. The same fabricator has also made changes on engineering charges. The extras for engineering work formerly were: Under 15 tons, 25c. a 100 lb.; 15 to 200 tons, 15c. a 100 lb.; 200 to 1000 tons, 10c. a 100 lb., and over 1000 tons, 5c. a 100 lb. A net increase is indicated in the new set up which is as follows: Less than 15 tons, 25c. a 100 lb.; 15 to 100 tons, 20c. a 100 lb.; 100 to 200 tons, 15c. a 100 lb.; 200 to 500 tons, 12½c. a 100 lb.; over 500 tons, 10c. a 100 lb.

SEMI-FINISHED STEEL

. . . Pittsburgh and Cleveland report heavier buying

SEMI-FINISHED sales have been a bright spot this month at CLEVELAND. Forging billets and rods are among items in best demand. Semi-finished specifications in the past week were as heavy, if not heavier, than a week ago at PITTSBURGH and orders so far this month are running from 10 to 20 per cent ahead of the same period in July. A heavy influx in specifications from non-integrated flat rolled steel makers is expected during the remainder of this month as the deadline approaches on old commitments.

TUBULAR GOODS

. . . Oil shut down may affect pipe specifications

PIPE producers remain mildly apprehensive concerning the probable effect on oil-country goods specifications of oil field shut downs. So far the result as it affects new business has not been marked but the situation is being carefully watched. At PITTSBURGH demand for other tubular products remains substantially the same as a week ago but total bookings so far this month are running ahead of a month ago. The Magnolia Pipe Line Co., Socony-Vacuum subsidiary, recently purchased about 300 mi. of line pipe, ranging in size from 2 in. to 8 in. Approximately 11,000 tons of pipe was involved in the order, part of which will be utilized for a gasoline line from Kilgore, East Texas, to Beaumont, Texas, and the balance for a line to run from Jackson County, Texas, to Sealy, Texas. The order was divided among National Tube Co., Jones & Laughlin Steel Corp., Bethlehem Steel Co., and Youngstown Sheet & Tube Co.

TIN PLATE

. . . Production sags to 66%; releases hold fairly well

TIN plate releases are holding up fairly well and shipments so far this month are slightly ahead of a month ago. New business is rather spotty and for the most part is unpredictable as can makers are keeping a close check on their inventories. This week activity has leveled off two points to 66 per cent.

Weekly Bookings of Construction Steel

	Week Ended				Year to Date	
	Aug. 22, 1939	Aug. 15, 1939	July 25, 1939	Aug. 23, 1938	1939	1938
Fabricated structural steel awards	16,450	10,745	19,150	33,600	652,575	466,625
Fabricated plate awards	1,390	1,105	870	1,500	109,880	91,490
Steel sheet piling awards	1,065	815	1,790	150	44,905	28,735
Reinforcing bar awards	6,610	4,055	11,535	15,650	306,760	203,920
Total Letting of Construction Steel..	25,515	16,720	33,345	50,900	1,114,120	790,770

IRON AND STEEL SCRAP

. . . Markets are strong, but few price advances have taken place . . . Composite unchanged at $15.46.

AUG. 22—Supplies are tight in most markets and brokers are competing for material in covering old orders. In the principal markets, however, mill sales have been in line with previously published prices, warranting no increase in the composite, which remains at $15.46 per gross ton. A Buffalo mill bought 2000 tons of No. 1 steel at a price within the quoted range, and a St. Louis mill purchased around 5000 tons of Nos. 1 and 2 without affecting dealer buying prices on these grades, although the prices paid were 50c. higher than on the last purchase made by this buyer two months ago. Generally, new buying has been light and at some points, like the Valley district, restrictions on shipments continue in force. Nevertheless, the market continues to exhibit strength in line with advancing open-hearth operations.

The crisis abroad is causing some concern among the exporters, but shipments are going forward steadily. It is expected that the Japanese will enter the market within the next few days and will be obliged to pay higher prices to meet domestic competition.

Pittsburgh

All scrap grades continue to reflect an exceptionally strong market tone. No. 1 heavy melting steel supplies are even scarcer than a week ago, with many brokers unable at this time to cover on old orders. Brokers are still offering $16 and more for No. 1 and the competition has extended to secondary grades. No. 1 steel remains unchanged this week at $16 to $16.50.

Chicago

Heavy melting steel in Chicago continues unchanged at $13.75 to $14 a gross ton delivered. The market seemingly has stiffened somewhat in the past week, however, and only an occasional carload can be purchased now for $13.75. Even a moderate tonnage today would require a $14 payment on the part of brokers. In spite of this situation, the leading buyer refuses to pay over $14 for delivery to the mill, and since he makes a few buys each week he is able to maintain the market at this level. Were another mill to enter the market it is considered almost certain that the price would rise sharply. There is no indication, however, that another buyer will be seen any time soon.

Cleveland

Scrap is coming out at the current price levels and dealers are not disposed to hang back. However, the past week has been quiet from the standpoint of new business, with principal activity centering around rail and vessel shipments against old orders. Restrictions in the Valley have contributed to the quiet tone. Prices are nominal.

Youngstown

Limitations on shipments continue in force at Warren. Elsewhere throughout the district there is no scramble for material at present, despite the fact mill operations are holding up by reason of backlogs. Quoted prices are unchanged.

Philadelphia

The market here continues very strong, but bullish sentiment of past weeks appears more subdued as steel making operations in this district continue at a pace substantially below national average. Tightness still exists in the supply situation with small dealers showing greater reluctance to part with material at present prices. Domestic consumers, however, are obtaining ample supplies. No new sales of No. 1 steel have been made in some time and quotations are unchanged, but on the basis of recent broker activity, No. 2 steel is now quoted at a flat $14.50. Several mill sales of heavy breakable were consummated in the past week at $16.50, delivered, making this item now quotable at $16 to $16.50, up 50c. All cast grades are fairly active.

Difficulty encountered in covering on export contracts and feeling of small yard men that new export business at higher prices is in the offing has forced brokers to raise prices on steel grades for export an average of 25c, making No. 1 now $15.50 to $15.75 and No. 2, $14.25 to $14.50. Export loadings of scrap at Port Richmond hit a new high in July at 37,000 tons, with Italy and Japan together accouning for close to 65 per cent of the shipments. Major tonnages shipped and point of destination follow: Italy, 13,700 tons; Japan, 10,500 tons; Poland, 9482 tons; Sweden, 2500 tons, and Great Britain, 1100 tons.

Buffalo

A local mill this week bought approximately 2000 tons of No. 1 heavy melting steel at a price within the quoted range. Shipments on old orders are moving freely. With the continuance of expanded steel operations further sales are expected in the near future. Cast grades are a little more active.

Cincinnati

The local scrap market continues to stay strong, despite the lack of substantial mill ordering. Dealer optimism is high and they are active in placing themselves in a position to take advantage of anticipated improvement in the fall. Shipments against current contracts continue to be good, but new business is nil.

St. Louis

A leading East Side mill purchased from 4000 to 6000 tons of Nos. 1 and 2 heavy melting steel, paying 50c. per ton higher than the last previous purchase two months back. This purchase coupled with a fairly large short interest has strengthened the market noticeably. Material of all descriptions is scarce and dealers are finding it hard to cover on contracts. The movement from the country is light, and railroads are also offering little scrap. Inventories in commercial yards continue to dwindle. Foundry grades are scarce and higher. Railroad lists: Mobile & Ohio, 260 tons; Chicago, Rock Island & Pacific, 2675; Chicago, Burlingon & Quincy, 2887 tons.

Detroit

Increasing tonnages will be offered on the Detroit scrap market within the next week as 1940 automobile production gets underway. Already there has been one offering of 50 cars of hydraulic compressed sheets from one firm which seldom offers such tonnage even at the peak of its operations. Activity generally is at a low ebb although the major producer is understood to have taken flashings recently through a dealer or dealers. Blast furnace scrap proves to be a slow moving commodity with current output considerably above current demand.

New York

Some new Japanese buying is expected this week. Because of the stronger domestic market and the new situation created by the announcement of the treaty abrogation, brokers are holding out for higher prices than have obtained so far this year. The excessively hot weather has had some effect in restricting supplies, but loadings for the Orient and Europe are going forward steadily. There is speculation as to what will happen to the huge undelivered tonnages on the European cartel contracts, the bulk of which is for delivery to Great Britain, should war break out abroad. Some feel that immediate upping of ocean freight rates will stop all flow of scrap abroad.

Boston

Prices on material for Pittsburgh district delivery are firm and unchanged; for eastern Pennsylvania, a little higher. For the latter, brokers pay $3.88 a ton on cars for regular turnings and $4.50 for short shoveling, and $10.75 a ton on cars for breakable cast. Where turnings can be shipped to eastern Pennsyvania by barge even better prices are offered on an alongside basis. The export market continues active and firm. No. 1 heavy melting steel is generally $14 a ton, delivered dock, with supply diminishing. Stove plate for export has sold at $10 a ton on dock, and an unconfirmed sale of breakable cast at $14 on dock is reported. At Providence an export sale of No. 1 textile cast at $14.50 a ton on cars is reported for an unnamed destination. Common talk is that Japan is sounding out the market for a large scrap steel tonnage, but actual details are lacking.

Iron and Steel Scrap Prices

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$16.00 to 16.50
Railroad hvy. mltng...	17.00 to 17.50
No. 2 hvy. mltng. steel.	14.00 to 14.50
Scrap rails	16.50 to 17.00
Rails 3 ft. and under..	18.50 to 19.00
Comp. sheet steel	16.00 to 16.50
Hand bundled sheets..	15.00 to 15.50
Hvy. steel axle turn..	14.50 to 15.00
Machine shop turn....	10.00 to 10.50
Short shov. turn.....	12.50 to 13.50
Mixed bor. & turn....	9.25 to 9.75
Cast iron borings.....	9.25 to 9.75
Cast iron carwheels...	15.50 to 16.00
Hvy. breakable cast...	13.00 to 13.50
No. 1 cupola cast.....	15.50 to 16.00
RR. knuckles & cplrs.	18.50 to 19.00
Rail coil springs	20.00 to 20.50
Rail leaf spring	19.00 to 19.50
Rolled steel wheels....	19.00 to 19.50
Low phos. billet crops.	20.00 to 20.50
Low phos. punchings..	18.50 to 19.00
Low phos. plate (heavy)	18.50 to 19.50
Railroad malleable ...	16.50 to 17.00

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$16.00 to $16.50
No. 2 hvy. mltng. steel.	14.50
Hydraulic bund., new .	16.00 to 16.50
Hydraulic bund., old..	12.50 to 13.00
Steel rails for rolling.	17.00 to 17.50
Cast iron carwheels...	16.00 to 16.50
Hvy. breakable cast...	16.00 to 16.50
No. 1 cast	16.50 to 17.00
Stove plate (steel wks.)	13.50 to 14.00
Railroad malleable ...	16.00 to 17.00
Machine shop turn....	9.00 to 9.50
No. 1 blast furnace....	6.50 to 7.00
Cast borings	6.50 to 7.00
Heavy axle turnings..	10.50 to 11.00
No. 1 low phos. hvy...	17.50 to 18.00
Couplers & knuckles..	17.50 to 18.00
Rolled steel wheels....	17.50 to 18.00
Steel axles	20.00 to 20.50
Shafting	20.50 to 21.00
Spec. iron & steel pipe	13.00 to 13.50
No. 1 forge fire.....	12.00 to 12.50
Cast boring (chem.)..	9.50 to 10.00

CHICAGO

Delivered to Chicago district consumers:

	Per Gross Ton
Hvy. mltng. steel	$13.75 to $14.00
Auto. hvy. mltng. steel alloy free	12.50 to 13.00
No. 2 auto steel	11.00 to 11.50
Shoveling steel	13.75 to 14.00
Factory bundles	12.75 to 13.25
Dealers' bundles	11.75 to 12.25
Drop forge flashings...	10.00 to 10.50
No. 1 busheling	12.50 to 13.00
No. 2 busheling, old...	5.75 to 6.25
Rolled carwheels	14.50 to 15.00
Railroad tires, cut ...	15.00 to 15.50
Railroad leaf springs..	14.50 to 15.00
Steel coup. & knuckles	14.50 to 15.00
Axle turnings	12.50 to 13.00
Coil springs	16.50 to 17.00
Axle turn. (elec.).....	13.50 to 14.00
Low phos. punchings..	15.50 to 16.00
Low phos. plates 12 in. and under	15.00 to 15.50
Cast iron borings	6.50 to 7.00
Short shov. turn.....	6.50 to 7.00
Machine shop turn....	6.50 to 7.00
Rerolling rails	18.00 to 18.50
Steel rails under 3 ft..	16.00 to 16.50
Steel rails under 2 ft..	16.50 to 17.00
Angle bars, steel	15.50 to 16.00
Cast iron carwheels ..	12.50 to 13.00
Railroad malleable	15.00 to 15.50
Agric. malleable	12.00 to 12.50

	Per Net Ton
Iron car axles	$18.00 to $18.50
Steel car axles	17.50 to 18.00
Locomotive tires	13.00 to 13.50
Pipes and flues	8.50 to 9.00
No. 1 machinery cast.	12.00 to 12.50
Clean auto. cast	12.50 to 13.00
No. 1 railroad cast....	11.00 to 11.50
No. 1 agric. cast	10.00 to 10.50
Stove plate	7.75 to 8.25
Grate bars	7.75 to 8.25
Brake shoes	9.50 to 10.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$15.25 to $15.75
No. 2 hvy. mltng. steel.	14.25 to 14.75
Low phos. plate	16.50 to 17.00
No. 1 busheling	14.25 to 14.75
Hydraulic bundles	14.75 to 15.25
Machine shop turn....	9.00 to 9.50

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$14.50 to $15.00
No. 2 hvy. mltng. steel.	13.50 to 14.00
Comp. sheet steel	14.25 to 14.75
Light bund. stampings	11.00 to 11.50
Drop forge flashings..	11.50 to 12.00
Machine shop turn....	7.50 to 8.00
Short shov. turn.	8.00 to 8.50
No. 1 busheling	13.50 to 14.00
Steel axle turnings....	10.50 to 11.00
Low phos. billet and bloom crops	18.50 to 19.00
Cast iron borings	8.50 to 9.00
Mixed bor. & turn.....	8.50 to 9.00
No. 2 busheling	8.50 to 9.00
No. 1 cupola cast	15.50 to 16.00
Railroad grate bars...	11.00 to 11.50
Stove plate	9.00 to 9.50
Rails under 3 ft.	17.75 to 18.25
Rails for rolling	18.25 to 18.75
Railroad malleable ...	15.50 to 16.00
Cast iron carwheels ..	14.00 to 14.50

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$14.50 to $15.00
No. 2 hvy. mltng. steel.	12.50 to 13.00
Scrap rails	15.50 to 16.00
New hvy. b'ndled sheets	13.00 to 13.50
Old hydraul. bundles.	11.50 to 12.00
Drop forge flashings...	12.50 to 13.00
No. 1 busheling	12.50 to 13.00
Machine shop turn....	8.00 to 8.50
Shov. turnings	9.50 to 10.00
Mixed bor. & turn.....	8.00 to 8.50
Cast iron borings.....	8.00 to 8.50
Knuckles & couplers..	15.00 to 15.50
Coil & leaf springs....	15.00 to 15.50
Rolled steel wheels....	15.00 to 15.50
No. 1 machinery cast..	15.00 to 16.00
No. 1 cupola cast.	14.50 to 15.00
Stove plate	12.00 to 12.50
Steel rails under 3 ft..	18.50 to 19.00
Cast iron carwheels...	13.50 to 14.00
Railroad malleable	15.00 to 15.50

ST. LOUIS

Dealers' buying prices per gross ton delivered to consumer:

Selected hvy. melting.	$12.50 to $13.00
No. 1 hvy. melting....	12.25 to 12.75
No. 2 hvy. melting....	11.75 to 12.25
No. 1 locomotive tires.	13.25 to 13.75
Misc. stand. sec. rails.	14.50 to 15.00
Railroad springs	15.00 to 15.50
Bundled sheets	8.00 to 8.50
No. 1 busheling	7.50 to 8.00
Cast. bor. & turn.....	2.50 to 3.00
Machine shop turn....	4.50 to 5.00
Heavy turnings	9.00 to 9.50
Rails for rolling	17.00 to 17.50
Steel car axles	18.50 to 19.00
No. 1 RR. wrought....	9.75 to 10.25
No. 2 RR. wrought....	12.50 to 13.00
Steel rails under 3 ft..	16.00 to 16.50
Steel angle bars	13.50 to 14.00
Cast iron carwheels...	14.75 to 15.25
No. 1 machinery cast.	15.00 to 15.50
Railroad malleable	12.50 to 13.00
No. 1 railroad cast....	12.50 to 13.00
Stove plate	7.50 to 8.00
Grate bars	8.50 to 9.00
Brake shoes	9.50 to 10.00

CINCINNATI

Dealers' buying prices per gross ton at yards:

No. 1 hvy. mltng. steel.	$11.50 to $12.00
No. 2 hvy. mltng. steel.	9.25 to 9.75
Scrap rails for mltng.	15.00 to 15.50
Loose sheet clippings.	7.00 to 7.50
Hydrau. b'ndled sheets	11.00 to 11.50
Cast iron borings	3.50 to 4.00
Machine shop turn....	4.75 to 5.25
No. 1 busheling	7.50 to 8.00
No. 2 busheling	2.50 to 3.00
Rails for rolling	17.00 to 17.50
No. 1 locomotive tires.	13.50 to 14.00
Short rails	17.75 to 18.25
Cast iron carwheels...	12.75 to 13.25
No. 1 machinery cast.	12.75 to 13.25
No. 1 railroad cast....	12.50 to 13.00
Burnt cast	6.75 to 7.25
Stove plate	6.75 to 7.25
Agricul. malleable	11.00 to 11.50
Railroad malleable	13.50 to 14.00
Mixed hvy. cast	11.25 to 11.75

BIRMINGHAM

Per gross ton delivered to consumer:

Hvy. melting steel....	$13.00
Scrap steel rails	$13.50 to 14.00
Short shov. turnings..	7.50
Stove plate	9.50
Steel axles	18.50
Iron axles	18.50
No. 1 RR. wrought.....	10.00
Rails for rolling	16.00 to 16.50
No. 1 cast.	15.00
Tramcar wheels	14.50 to 15.00

DETROIT

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. industrial steel	$11.00 to $11.50
No. 2 hvy. mltng. steel.	10.00 to 10.50
Borings and Turnings.	5.75 to 6.25
Long turnings	5.75 to 6.75
Short shov. turnings..	6.50 to 7.00
No. 1 machinery cast..	13.00 to 13.50
Automotive cast	13.50 to 14.00
Hvy. breakable cast...	9.50 to 10.00
Stove plate	8.00 to 8.50
Hydraul. comp. sheets.	12.50 to 13.00
New factory bushel....	11.00 to 11.50
Sheet clippings	8.25 to 9.25
Flashings	10.50 to 11.00
Low phos. plate scrap.	12.00 to 12.50

NEW YORK

Dealers' buying prices per gross ton on cars:

No. 1 hvy. mltng. steel.	$11.50 to $12.00
No. 2 hvy. mltng. steel.	9.00 to 9.50
Hvy. breakable cast...	11.50 to 12.00
No. 1 machinery cast.	11.50 to 12.00
No. 2 cast	9.50 to 10.00
Stove plate	9.50 to 10.00
Steel car axles	15.00 to 15.50
Shafting	15.00 to 15.50
No. 1 RR. wrought....	11.00 to 11.50
No. 1 wrought long....	9.50 to 10.00
Spec. iron & steel pipe	9.00 to 9.50
Rails for rolling	16.00 to 16.50
Clean steel turnings*..	4.50 to 5.00
Cast borings*	3.50 to 4.00
No. 1 blast furnace....	3.50 to 4.00
Cast borings (chem.)..	9.50 to 10.00
Unprepared yard scrap	6.00 to 6.50
Light iron	3.00 to 3.50
Per gross ton, delivered local foundries:	
No. 1 machn. cast†....	$13.50 to $14.00
No. 2 cast†	10.50 to 11.00

* $1.50 less for truck loads.
† Northern N. J. prices are $2 to $2.50 higher

BOSTON

Dealers' buying prices per gross ton:

Breakable cast	$10.50 to $10.75
Machine shop turn.....	4.65
Mixed bor. & turn.....	2.25
Bun. skeleton long	8.15
Shafting	16.15
Cast bor. chemical....	5.00 to 6.00
Per gross ton delivered consumers' yards:	
Textile cast	$14.00 to $14.50
No. 1 machine cast....	13.50 to 14.50
Per gross ton delivered dealers' yards:	
No. 1 hvy. mltng. steel.	$12.00 to $12.50
No. 2 steel	10.50 to 11.00

PACIFIC COAST

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$13.00 to $13.50
No. 2 hvy. mltng. steel.	12.50 to 13.00

CANADA

Dealers' buying prices at their yards, per gross ton:

	Toronto	Montreal
No. 1 hvy. mltng. steel.	$9.25	$8.75
No. 2 hvy. mltng. steel.	8.00	7.50
Mixed dealers steel....	6.75	6.25
Drop forge flashings...	8.25	7.75
New loose clippings...	4.25	3.75
Busheling, ...	3.75	3.25
Scrap pipe	4.25	3.75
Steel turnings	4.25	3.75
Cast borings	3.75	3.25
Machinery cast	14.00	13.50
Dealers cast	12.00	11.50
Stove plate	8.00	7.50

EXPORT

Dealers' buying prices per gross ton:

New York, truck lots, delivered, barges

No. 1 hvy. mltng. steel.	$12.50 to $13.00
No. 2 hvy. mltng. steel.	11.00 to 11.50
No. 2 cast	10.50 to 11.00
Stove plate	9.50 to 10.00

Boston on cars at Army Base or Mystic Wharf

No. 1 hvy. mltng. steel.	$14.00 to $14.25
No. 2 hvy. mltng. steel.	13.00
Rails (scrap)	14.00 to 14.25

Philadelphia, delivered alongside boats, Port Richmond.

No. 1 hvy. mltng. steel.	$15.50 to 15.75
No. 2 hvy. mltng. steel.	14.25 to 14.50

PRICES ON FINISHED AND SEMI-FINISHED IRON AND STEEL

Steel prices on these pages are base prices only and f.o.b. mill unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, deductions, and in most cases the amount of freight which must be absorbed in order to meet competition.

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (Rerolling only). Prices delivered Detroit are $2 higher. F.o.b. Duluth, billets only, $2 higher.

	Per Gross Ton
Rerolling	$34.00
Forging quality	40.00

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

	Per Gross Ton
Open hearth or bessemer	$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved, universal and sheared	1.90c.

Wire Rods

(No. 5 to 9/32 in.)

	Per Gross Ton
Pittsburgh, Chicago or Cleveland	$43.00
Worcester, Mass.	45.00
Birmingham	43.00
San Francisco	52.00

Rods over 9/32 in. or 47/64 in., inclusive, $5 a ton over base.

SOFT STEEL BARS

	Base per Lb.
Pittsburgh, Chicago, Gary, Cleveland, Buffalo and Birmingham	2.15c.
Detroit, delivered	2.25c.
Duluth	2.25c.
Philadelphia, delivered	2.47c.
New York	2.49c.
On cars dock Gulf ports	2.50c.
On cars dock Pacific ports	2.75c.

RAIL STEEL BARS

(For merchant trade)

Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham	2.00c.
On cars dock Tex. Gulf ports	2.45c.
On cars dock Pacific ports	2.70c.

BILLET STEEL REINFORCING BARS

(Straight lengths as quoted by distributers)

Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Cleveland, Youngstown or Sparrows Pt.	1.90c.
Detroit, delivered	2.00c.
On cars dock Tex. Gulf ports	2.25c.
On cars dock Pacific ports	2.35c.

RAIL STEEL REINFORCING BARS

(Straight lengths as quoted by distributers)

Pittsburgh, Chicago, Gary, Buffalo, Cleveland, Youngstown or Birmingham	1.80c.
Detroit, delivered	1.90c.
On cars dock Tex. Gulf ports	2.15c.
On cars dock Pacific ports	2.25c.

IRON BARS

Chicago and Terra Haute	2.15c.
Pittsburgh (refined)	3.60c.

COLD FINISHED BARS AND SHAFTING*

Pittsburgh, Buffalo, Cleveland, Chicago, and Gary	2.65c.
Detroit	2.70c.

* In quantities of 10,000 to 19,999 lb.

PLATES

	Base per Lb.
Pittsburgh, Chicago, Gary, Birmingham, Sparrows Point, Cleveland, Youngstown, Coatesville, Claymont, Del.	2.10c.*
Philadelphia, del'd	2.05c. to 2.15c.
New York, del'd	2.19c. to 2.29c.
On cars dock Gulf ports	2.45c.
On cars dock Pacific ports	2.60c.
Wrought iron plates, P'tg	3.80c.

* Subject to concessions, particularly in the East, of $2 a ton.

FLOOR PLATES

Pittsburgh or Chicago	3.35c.
New York, del'd	3.71c.
On cars dock Gulf ports	3.70c.
On cars dock Pacific ports	3.95c.

STRUCTURAL SHAPES

	Base per Lb.
Pittsburgh, Chicago, Gary, Buffalo, Bethlehem or Birmingham	2.10c.
Philadelphia, del'd	2.215c.
New York, del'd	2.27c.
On cars dock Gulf ports	2.45c.
On cars dock Pacific ports	2.70c.

STEEL SHEET PILING

	Base per Lb.
Pittsburgh, Chicago or Buffalo	2.40c.
On cars dock Gulf ports	2.85c.
On cars dock Pacific ports	2.90c.

RAILS AND TRACK SUPPLIES

F.o.b. Mill

Standard rails, heavier than 60 lb., per gross ton	$40.00
Angle bars, per 100 lb.	2.70

F.o.b. Basing Points

Light rails (from billets) per gross ton	$40.00
Light rails (from rail steel) per gross ton	39.00

	Base per Lb.
Cut spikes	3.00c.
Screw spikes	4.55c.
Tie plates, steel	2.15c.
Tie plates, Pacific Coast ports	2.25c.
Track bolts, to steam railroads	4.15c.
Track bolts to jobbers, all sizes (per 100 counts)	65-5

Basing points on light rails are Pittsburgh, Chicago and Birmingham; on spikes and tie plates, Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; on tie plates alone, Steelton, Pa., Buffalo; on spikes alone, Youngstown, Lebanon, Pa., Richmond, Va.

SHEETS

Hot Rolled

	Base per Lb.
Pittsburgh, Gary, Birmingham, Buffalo, Sparrows Point, Cleveland, Youngstown, Middletown or Chicago	2.00c.
Detroit, delivered	2.10c.
Philadelphia, delivered	2.17c.
Granite City	2.10c.
On cars dock Pacific ports	2.50c.
Wrought iron, Pittsburgh	4.10c.

Cold Rolled*

Pittsburgh, Gary, Buffalo, Youngstown, Cleveland, Middletown or Chicago	3.05c.
Detroit, delivered	3.15c.
Granite City	3.15c.
Philadelphia, delivered	3.37c.
On cars dock Pacific ports	3.65c.

* Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base.

From May 10 up to and including May 15, reductions from the base price of hot and cold rolled sheets running from $4 to $8 a ton were prevalent. Concessions withdrawn, on May 15.

Subsequent to May 15, many orders originally placed at $4 to $6 below the base price were adjusted to the full $8 concession.

Galvanized Sheets, 24 Gage

Pittsburgh, Chicago, Gary, Sparrows Point, Buffalo, Middletown, Youngstown or Birmingham	3.50c.
Philadelphia, delv'd	3.67c.
Granite City	3.60c.
On cars dock Pacific ports	4.00c.
Wrought iron, Pittsburgh	6.10c.

Electrical Sheets

(F.o.b. Pittsburgh)

	Base per Lb.
Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
Motor	4.95c.
Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.

Silicon Strip in coils—Sheet price plus silicon sheet extra width extra plus $5c per 100 lb. for coils. Pacific ports add 70c. a 100 lb

Long Ternes

No. 24 unassorted 8-lb. coating f.o.b. Pittsburgh or Gary	3.80c.
F.o.b. cars dock Pacific ports	4.50c.

Vitreous Enameling Stock, 20 Gage*

Pittsburgh, Chicago, Gary, Youngstown, Middletown or Cleveland	3.35c.
Detroit, delv'd	3.45c.
Granite City	3.45c.
On cars dock Pacific ports	3.95c.

TIN MILL PRODUCTS

***Tin Plate**

	Per Base Box
Standard cokes, Pittsburgh, Chicago and Gary	$5.00
Standard cokes, Granite City	5.10

* Prices effective Nov. 10 on shipments through first quarter of 1939.

Special Coated Manufacturing Ternes

	Per Base Box
Granite City	$4.40
Pittsburgh or Gary	4.30

Roofing Terne Plate

(F.o.b. Pittsburgh)

(Per Package, 112 sheets, 20 x 28 in.)	
8-lb. coating I.C.	$12.00
15-lb. coating I.C.	14.00
20-lb. coating I.C.	15.00
25-lb. coating I.C.	16.00
30-lb. coating I.C.	17.25
40-lb. coating I.C.	19.50

Black Plate, 29 gage and lighter

Pittsburgh, Chicago and Gary	3.05c.
Granite City	3.15c.
On cars dock Pacific ports, boxed	4.00c.

HOT ROLLED STRIP

(Widths up to 12 in.)

	Base per Lb
Pittsburgh, Chicago, Gary, Cleveland, Middletown, Youngstown or Birmingham	2.00c.
Detroit, delivered	2.10c.

Cooperage Stock

Pittsburgh & Chicago	2.10c.

From May 10 up to and including May 15, reductions in the base price of hot rolled strip running from $4 to $8 a ton were prevalent. Concessions withdrawn on May 15.

Subsequent to May 15, many orders originally placed at $4 to $6 below the base price were adjusted to the full $8 concession.

COLD ROLLED STRIP*

	Base per Lb.
Pittsburgh, Youngstown or Cleveland	2.80c.
Chicago	2.90c.
Detroit, delivered	2.90c.
Worcester	3.00c.

* Carbon 0.25 and less.

Commodity Cold Rolled Strip

Pittsburgh, Youngstown, or Cleveland	2.95c.
Detroit, delivered	3.05c.
Worcester	3.35c.

From May 10 up to and including May 15, reductions from the base price of cold rolled strip amounting to $4 a ton were prevalent. Concessions withdrawn on May 15.

COLD ROLLED SPRING STEEL

		Pittsburgh and Cleveland	Worcester
Carbon	0.26-0.50%	2.80c.	3.00c.
Carbon	0.51-0.75	4.30c.	4.50c.
Carbon	0.76-1.00	6.15c.	6.35c.
Carbon	1.01-1.25	8.35c.	8.55c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh, Chicago, Cleveland and Birmingham)

To Manufacturing Trade

	Per Lb.
Bright wire	2.60c.
Galvanized wire, base	2.65c.*
Spring wire	3.20c.

* On galvanizing wire to manufacturing trade, size and galvanizing extras are charged, the price Nos. 6 to 9 gage, inclusive, thus being 3.15c.

To the Trade

	Base per Keg
Standard wire nails	$2.40
Coated nails	2.40
Cut nails, carloads	3.60

	Base per 100 Lb.
Annealed fence wire	$2.90
Galvanized fence wire	3.30
Polished staples	3.10
Galvanized staples	3.35
Twisted barbless wire	3.25
Woven wire fence, base column.	67
Single loop bale ties, base col...	56
Stand. 2 pt., 12.5 gage barbed cattle wire, per 80 rod spool...	$2.58
Stand. 2 pt., 12.5 gage barbed hog wire, per 80 rod spool....	$2.76

Note: Birmingham base same on above items, except spring wire.

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

F.o.b. Pittsburgh only on wrought iron pipe.

Butt Weld

Steel In.	Black	Galv.	*Wrought Iron* In.	Black	Galv.
⅛	..56	36	¼ & ⅜	.+9	+30
¼ to ⅜	.59	43½	½	..24	6½
½	..63½	54	¾	..30	13
¾	..66½	60½	1 & 1¼	.34	19
1 to 3	..68½	60½	1½	..38	21½
			2	..37½	21

Lap Weld

2	..61	52½	2	..30½	15
2½ & 3	..64	55½	2½ to 3½	31½	17½
3½ to 6.66		57½	4	..33½	21
7 & 8.65		55½	4½ to 8.32½		20
9 & 10.64½		55	9 to 12	..28½	15
11 & 12.63½		54			

Butt weld, extra strong, plain ends

⅛	..54½	41½	¼ & ⅜	.+10	+43
½ to ⅜	.56½	45½	½	..25	9
½	..61½	37½	¾	..31	15
¾	..65½	57½	1 to 2	..38	22½
1 to 3	..67	60			

Lap weld, extra strong, plain ends

2	..59	51½	2	..33½	18½
2½ & 3	..63	55½	2½ to 4.39½		25½
3½ to 6.66½		59	4½ to 6.37½		24
7 & 8.65½		56	7 & 8	..38½	24½
9 & 10.64½		55	9 to 12	..32	20½
11 & 12.63½		54			

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount of $4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or $2 a ton higher, on all butt weld 8 in. and smaller.

Boiler Tubes

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes. Minimum Wall. (Net base prices per 100 ft. f.o.b. Pittsburgh in carload lots)

	Seamless Cold Drawn	Seamless Hot Rolled	Lap Weld Hot Rolled
1 in. o.d. 13 B.W.G.	$ 9.01	$ 7.82	....
1¼ in. o.d. 13 B.W.G.	10.67	9.26	....
1½ in. o.d. 13 B.W.G.	11.70	10.23	$9.72
1¾ in. o.d. 13 B.W.G.	13.42	11.64	11.06
1 in. o.d. 13 B.W.G.	15.03	13.04	12.38
2¼ in. o.d. 13 B.W.G.	16.76	14.54	13.79
2½ in. o.d. 12 B.W.G.	18.45	16.01	15.16
2¾ in. o.d. 12 B.W.G.	20.21	17.54	16.58
2¾ in. o.d. 12 B.W.G.	21.42	18.59	17.54
3 in. o.d. 12 B.W.G.	22.48	19.50	18.35
3½ in. o.d. 11 B.W.G.	28.37	24.62	23.15
4 in. o.d. 10 B.W.G.	35.20	30.54	28.66
4½ in. o.d. 10 B.W.G.	43.04	37.35	35.22
5 in. o.d. 9 B.W.G.	54.01	46.87	44.25
6 in. o.d. 7 B.W.G.	82.93	71.96	68.14

Extras for less carload quantities:

40,000 lb. or ft. over	Base
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft. to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	30%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. to 4,999 lb. or ft.	45%
Under 2,000 lb. or ft.	65%

CAST IRON WATER PIPE

	Per Net Ton
*6-in. and larger, del'd Chicago.	$51.00
6-in. and larger, del'd New York	49.00
*6-in. and larger, Birmingham.	43.00
6-in. and larger, f.o.b. dock, San Francisco or Los Angeles....	52.00
F.o.b dock, Seattle	52.00
4-in. f.o.b. dock, San Francisco or Los Angeles	55.00
F.o.b. dock, Seattle	52.00

Class "A" and gas pipe, $3 extra 4-in. pipe is $3 a ton above 6-in.

Prices for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is $42, Birmingham, and $5 delivered Chicago and 4-in. pipe, $45, Birmingham, and $54 delivered Chicago.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland Birmingham or Chicago)

	Per Cent Off List
Machine and carriage bolts:	
½ in. and 6 in. and smaller....	68½
Larger and longer up to 1 in..	66
1⅛ in. and larger	64
Lag bolts	66
Plow bolts, Nos. 1, 2, 3, and 7	68½
Hot pressed nuts, and c.p.c. and t-nuts, square or hex. blank or tapped:	
½ in. and smaller	67
9/16 in. to 1 in. inclusive	64
1⅛ in. and larger	62

On the above items with the exception of plow bolts, there is an additional allowance of 10 per cent for full container quantities.

On all of the above items there is an additional 5 per cent allowance for carload shipments.

Semi-fin. hexagon nuts	U.S.S.	S.A.E.
½ in. and smaller	67	70
9/16 to 1 in.	64	65
1⅛ in. and larger	62	62

In full container lots, 10 per cent additional discount.

Stove bolts in packages, nuts attached	72½
Stove bolts in packages, with nuts separate	72½ and 12½
Stove bolts in bulk	84

On stove bolts freight is allowed to destination on 200 lb. and over.

Large Rivets

(½ in. and larger)

	Base Per 100 Lb.
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	$3.40

Small Rivets

(7/16 in. and smaller)

	Per Cent Off List
F.o.b. Pittsburgh, Cleveland Chicago, Birmingham	65 and 10

Cap and Set Screws

(Freight allowed to destination)

	Per Cent Off List
Milled hexagon head, cap screws, 1 in. dia. and smaller	50 and 10
Milled headless set screws, cut thread ¾ in. and smaller	70
Upset hex. head cap screws U.S.S. or S.A.E. thread 1 in. and smaller	75
Upset set screws, cup and oval points	77½
Milled studs	60

Alloy Steel

Alloy Steel Blooms, Billets and Slabs

F.ob. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem. Base price, $56.00 a gross ton.

Alloy Steel Bars

F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton. Open-hearth grade, base.....2.70c.

Delivered, Detroit .....2.80c.

S.A.E. Series Numbers	Alloy Differential per 100 Lb.
2100 (1½% Nickel)	$0.75
2300 (3½% Nickel)	1.55
2500 (5% Nickel)	2.25
3100 Nickel-chromium	0.70
3200 Nickel-chromium	1.85
3300 Nickel-chromium	3.80
3400 Nickel-chromium	3.20
4100 Chromium-molybdenum (0.15 to 0.25 Molybdenum)	0.55
4100 Chromium-molybdenum (0.25 to 0.40 Molybdenum)	0.75
4340 Chr.-Ni.-Mo.	1.65
4345 Chro.-Ni.-Mo.	1.55
4600 Nickel - molybdenum (0.20 to 0.30 Mo. 1.50 to 2.00 Ni.)	1.10
5100 Chrome steel (0.60-0.90 Cr.)	0.35
5100 Chrome steel (0.80-1.10 Cr.)	0.45
6100 Chromium spring steel	0.15
6100 Chromium-vanadium bar	1.20
6100 Chromium-vanadium spring steel	0.85
Chromium-nickel vanadium	1.50
Carbon-vanadium	0.35

These prices are for hot-rolled steel bars. The differential for most grades in electric furnace steel is 50c. higher. Slabs with a section area of 16 in. and 2½ in. thick or over take the billet base.

Alloy Cold-Finished Bars

F.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 3.35c. base per lb. Delivered Detroit, 3.45c., carlots

STAINLESS & HEAT RESISTANT ALLOYS

(Base prices, cents per lb. f.o.b. Pittsburgh)

Chrome-Nickel

	No. 304	No. 302
Forging billets	21.25c.	20.40c.
Bars	25c.	24c.
Plates	29c.	27c.
Structural shapes	25c.	24c.
Sheets	36c.	34c.
Hot-rolled strip	23.50c.	21.50c.
Cold-rolled strip	30c.	28c.
Drawn wire	25c.	24c.

Straight Chrome

	No. 410	No. 430	No. 442	No. 446
Bars	18.50c.	19c.	22.50c.	27.50c.
Plates	21.50c	22c.	25.50c.	30.50c.
Sheets	26.50c.	29c.	32.50c.	36.50c.
Hot stp.	17c.	17.50c.	24c.	35c.
Cold stp.	22c.	22.50c.	32c.	52c.

TOOL STEEL

High speed	67c.
High-carbon-chrome	43c.
Oil-hardening	24c.
Special	22c.
Extra	18c.
Regular	14c.

Prices for warehouse distribution to all points on or East of Mississippi River are 2c. a lb. higher. West of Mississippi quotations are 3c. a lb. higher.

British and Continental

BRITISH

Per Gross Ton f.o.b. United Kingdom Ports

Ferromanganese, export	Nominal
Tin plate, per base box	20s. 3d. to 21s.
Steel bars, open hearth	£10 8s.
Beams, open hearth	£10
Channels, open hearth	£10 5s.
Angles, open-hearth	£10
Black sheets, No. 24 gage	£13
Galvanized sheets, No. 24 gage	£15 15s.

CONTINENTAL

Per Gross Ton, Gold £, f.o.b. Continental Ports

Billets, Thomas	Nominal
Wire rods, No. 5 B.W.G.	£5 10s.
Steel bars, merchant	£5 5s.
Sheet Bars	Nominal
Plate ¼ in. and up	£5 7s.
Plate 3/16 in. and 5 mm.	£5 13s.
Sheet ⅛ in.	£5 9s. 6d.
Beams, Thomas	£4 18s.
Angles (Basic)	£4 18s.
Hoops and strip, base	£5 12s.

RAW MATERIALS PRICES

PIG IRON

No. 2 Foundry

F.o.b. Everett, Mass.	$22.00
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa., and Sparrows Point, Md.	22.00
Delivered Brooklyn	24.50
Delivered Newark or Jersey City	23.53
Delivered Philadelphia	22.84
F.o.b. Neville Island, Erie, Pa. Toledo, Chicago, Granite City, Cleveland and Youngstown	21.00
F.o.b. Buffalo	21.00
F.o.b. Detroit	21.00
Southern, delivered Cincinnati	21.06
Northern, delivered, Cincinnati	21.44
F.o.b. Duluth	21.50
F.o.b. Provo, Utah	19.00
Delivered, San Francisco, Los Angeles or Seattle	24.50
F.o.b. Birmingham*	17.38

* Delivered prices on southern iron for shipment to northern points are 38c. a ton below delivered prices from nearest northern basing point on iron with phosphorus content of 0.70 per cent and over.

Malleable

Base prices on malleable iron are 50c. a ton above No. 2 foundry quotations at Everett, Eastern Pennsylvania furnaces, Erie and Buffalo. Elsewhere they are the same, except at Birmingham and Provo, which are not malleable iron basing points.

Basic

F.o.b. Everett, Mass.	$21.50
F.o.b. Bethlehem, Birdsboro, Swedeland and Steelton, Pa., and Sparrows Point, Md.	21.50
F.o.b. Buffalo	20.00
F.o.b. Neville Island, Erie, Pa., Toledo, Chicago, Granite City, Cleveland and Youngstown	20.50
Delivered Philadelphia	22.34
Delivered Canton, Ohio	21.89
Delivered Mansfield, Ohio	22.44
F.o.b. Birmingham	16.00

Bessemer

F.o.b. Buffalo	$22.00
F.o.b. Everett, Mass.	23.00
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa.	23.00
Delivered Newark or Jersey City	24.53
Erie, Pa., and Duluth	22.00
F.o.b. Neville Island, Toledo, Chicago and Youngstown	21.50
F.o.b. Birmingham	22.00
Delivered Cincinnati	22.11
Delivered Canton, Ohio	22.89
Delivered Mansfield, Ohio	23.44

Low Phosphorus

Basing points: Birdsboro, Pa., Steelton, Pa., and Standish, N. Y.	$26.50

Gray Forge

Valley or Pittsburgh furnace	$20.50

Charcoal

Lake Superior furnace	$25.00
Delivered Chicago	28.34

Canadian Pig Iron

Per Gross Ton

Montreal	
Foundry iron	$24.50 base
Malleable	25.00 base
Basic	24.50 base
Toronto	
Foundry iron	$22.50 base
Malleable	23.00 base
Basic	22.50 base

On all grades 2.25 per cent silicon and under is base. For each 25 points of silicon over 2.25 per cent an extra of 25c. is charged.

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.

Per Gross Ton

Domestic, 80% (carload)	$80.00

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%	$28.00
Domestic, 26 to 28%	33.00

Electric Ferrosilicon

Per Gross Ton Delivered; Lump Size

50% (carload lots, bulk)	$69.50*
50% (ton lots in 50 gal. bbl.)	80.50*
75% (carload lots, bulk)	126.00*
75% (ton lots in 50 gal. bbl.)	139.00*

Bessemer Ferrosilicon

F.o.b. Furnace, Jackson, Ohio

Per Gross Ton

10.00 to 10.50%	$30.50

For each additional 0.50% silicon up to 12%, 50c. per ton is added. Above 12% add 75c. per ton.

For each unit of manganese over 2%, $1 per ton additional.

Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Silvery Iron

Per Gross Ton

F.o.b. Jackson, Ohio, 5.00 to 5.50%	$24.50

For each additional 0.5% silicon up to 12%, 50c. a ton is added. Above 12% add 75c. a ton.

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Manganese, each unit over 2%, $1 a ton additional. Phosphorus 0.75% or over, $1 a ton additional.

Ferrochrome

Per Lb. Contained Cr., Delivered Carlots, Lump Size, on Contract

4 to 6% carbon	10.50c.*
2% carbon	16.50c.*
1% carbon	17.50c.*
0.10% carbon	19.50c.*
0.06% carbon	20.00c.*

Silico-Manganese

Per Gross Ton, Delivered, Lump Size, Bulk, on Contract

3% carbon	$83.00
2.50% carbon	88.00
2% carbon	93.00
1% carbon	103.00

Other Ferroalloys

Ferrotungsten, per lb. contained W del., carloads	$1.75
Ferrotungsten, 100 lbs. and less	2.00
Ferrovanadium, contract, per lb. contained V., delivered	$2.70 to $2.90†
Ferrocolumbium, per lb. contained columbium, f.o.b. Niagara Falls, N. Y., ton lots	$2.25†
Ferrocarbontitanium, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace carload and contract per net ton	$142.50
Ferrocarbontitanium, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract, per net ton	$157.50
Ferrophosphorus, electric, or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with $3 unitage, freight equalized with Rockdale, Tenn., per gross ton	$58.50
Ferrophosphorus, electrolytic, 23-26% in car lots, f.o.b. Monsanto (Siglo), Tenn., 24%, per gross ton, $3 unitage, freight equalized with Nashville	$75.00
Ferromolybdenum, per lb. Mo. f.o.b. furnace	95c.
Calcium molybdate, per lb. Mo. f.o.b. furnace	80c.
Molybdenum oxide briquettes 48-52% Mo; per lb. contained Mo, f.o.b. Langeloth, Pa.	80c.

* Spot prices are $5 per ton higher.
† Spot prices are 10c. per lb. of contained element higher.

ORES

Lake Superior Ores

Delivered Lower Lake Ports

Per Gross Ton

Old range, Bessemer, 51.50%	$5.25
Old range, non-Bessemer, 51.50%	5.10
Messabi, Bessemer, 51.50%	5.10
Messabi, non-Bessemer, 51.50%	4.95
High phosphorus, 51.50%	4.85

Foreign Ore

C.i.f. Philadelphia or Baltimore

Per Unit

Iron, low phos., copper free, 55 to 58% dry, Algeria	12c.
Iron, low phos., Swedish, average, 68½% iron	12c.
Iron, basic or foundry, Swedish, aver. 65% iron	10½c.
Iron, basic or foundry, Russian, aver. 65% iron	Nominal
Man., Caucasian, washed 52%	29c.
Man., African, Indian, 44-48%	25c.
Man., African, Indian, 49-51%	30c.
Man., Brazilian, 46 to 48%	27c.

Per Short Ton Unit

Tungsten, Chinese, Wolframite, duty paid, delivered	$18.00
Tungsten, domestic, scheelite delivered	$16.00 to $17.00
Chrome or (lump) c.i.f. Atlantic Seaboard, per gross ton: South African (low grade)	$15.00
Rhodesian, 45%	19.00
Rhodesian, 48%	22.00
Turkish, 48-49%	22.50
Turkish, 45-56%	19.50
Turkish, 40-41%	17.00
Chrome concentrates (Turkish) c.i.f. Atlantic Seaboard, per gross ton: 50%	$24.00
48-49%	23.50

FLUORSPAR

Per Net Ton

Domestic washed gravel, 85-5, f.o.b. Kentucky and Illinois mines, all rail	$16.00 to $17.00
Domestic, f.o.b. Ohio River landing barges	$16.50 to 17.50
No. 2 lump, 85-5, f.o.b. Kentucky and Ill. mines	$17.00 to 18.00
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic ports, duty paid	21.50
Domestic No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines	31.50

FUEL OIL

Per Gal.

No. 2, f.o.b. Bayonne, N. J.	4.00c.
No. 6, f.o.b. Bayonne, N. J.	2.50c.
No. 5 Bur. Stds., del'd Chicago	3.25c.
No. 6 Bur. Stds., del'd Chicago	2.75c.
No. 3 distillate, del'd Cleve'd.	5.50c.
No. 4 industrial, del'd Cleve'd.	5.25c.
No. 5 industrial, del'd Cleve'd.	3.75c.
No. 6 industrial, del'd Cleve'd.	3.50c.

COKE

Per Net Ton

Furnace, f.o.b. Connellsville, Prompt	$3.75
Furnace, f.o.b. Connellsville, Prompt	$4.75 to 5.50
Foundry, by - product Chicago ovens	10.25
Foundry, by - product, del'd New England	12.50
Foundry, by - product, del'd Newark or Jersey City	10.88 to 11.40
Foundry, by - product, Philadelphia	10.95
Foundry, by - product, delivered Cleveland	10.30
Foundry, by - product, delivered Cincinnati	9.75
Foundry, Birmingham	7.50
Foundry, by - product, del'd St. Louis industrial district	10.75 to 11.00
Foundry, from Birmingham, f.o.b. cars dock Pacific ports	14.75

IRON AND STEEL WAREHOUSE PRICES

PITTSBURGH*

	Base per Lb.
Plates	3.40c.
Shapes	3.40c.
Soft steel bars and small shapes	3.35c.
Reinforcing steel bars	2.70c.
Cold finished bars and screw stock	3.65c.
Hot rolled strip	3.60c.
Hot rolled sheets	3.35c.
Galv. sheets (24 ga.) 500 lb. to 1499 lb.	4.50c.
Wire, black, soft annealed	3.15c.
Wire, galv., soft	3.55c.
Track spikes (1 to 24 kegs)	3.60c.
Wire nails (in 100-lb. kegs)	2.65c.

On plates, structurals, bars, strip and hot rolled sheets, base applied to orders of 400 to 1999 lb.
On reinforcing bars base applies to orders of less than one ton and includes switching and carting charge.
All above prices for delivery within the Pittsburgh switching district.

NEW YORK

	Base per Lb.
Plates, ¼ in. and heavier	3.76c.
Structural shapes	3.75c.
Soft steel bars, round	3.84c.
Iron bars, Swed. charcoal	7.25c.
Cold-fin. shafting and screw stock:	
Rounds, squares, hexagons	4.09c.
Flats up to 12 in. wide	4.09c.
Cold-rolled strip soft and quarter hard	3.51c.
Hot-rolled strip, soft O.H.	3.96c.
*Hot-rolled sheets (8-30 ga.)	3.40c.
Galv. sheets (24 ga.)	4.50c.
Long ternes (24 ga.)	5.50c.
Cold-rolled sheets (20 ga.)	
Standard quality	4.60c.
Deep drawing	4.85c.
Stretcher leveled	5.10c.
SAE, 2300, hot-rolled	7.35c.
SAE, 3100, hot-rolled	5.90c.
SAE, 6100, hot-rolled annealed	8.75c.
SAE, 2300, cold-rolled	8.59c.
SAE, 3100, cold-rolled, annealed	8.19c.
Floor plate, ⅛ in. and heavier	5.56c.
Standard tool steel	12.50c.
Wire, black, annealed (No. 9)	4.35c.
Wire, galv. (No. 9)	4.70c.
Open-hearth spring steel	4.75c. to 10.25c.
Common wire nails, per keg in lots of five kegs or more	$2.65

*For lots less than 2000 lb.

CHICAGO

	Base per Lb.
Plates and structural shapes	3.55c.
Soft steel bars, rounds and angles	3.50c.
Soft steel squares, hexagons, channels and Tees	3.65c.
Hot rolled strip	3.60c.
Floor plates	5.15c.
Hot rolled sheets	3.35c.
Galvanized sheets	4.25c.
Cold rolled sheets	4.30c.
Cold finished carbon bars	3.75c.

Above prices are subject to deductions and extras for quantity and are f.o.b. consumer's plant within Chicago free delivery zone.

CLEVELAND

	Base per Lb.
Plates	3.40c.
Structural shapes	3.58c.
Soft steel bars	3.25c.
Reinfor. bars (under 2000 lb.)†	2.55c.
Cold-fin. bars (1000 lb., over.)	3.75c.
Hot-rolled strip	3.50c.
Cold rolled sheets	4.55c.
Cold-finished strip	3.20c.
Galvanized sheets (No. 24)	4.62c.
Hot-rolled sheets	3.35c.
Floor plates, 3/16 in. and heavier	5.18c.
*Black ann'l'd wire, per 100 lb.	$3.10
*No. 9 galv. wire, per 100 lb.	3.50
*Com. wire nails, base per keg	2.60
Hot rolled alloy steel (3100)	5.85c.
Cold rolled alloy steel (3115)	6.75c.

* For 5000 lb. or less.
† 500 lb. base quantity.
Prices shown on hot rolled bars, strip, sheets, shapes and plates are for 400 to 1999 lb. Alloy steel, 1000 lb. and over; galvanized sheets, 150 to 1499 lb.; cold rolled sheets, 399 lb. and under.

ST. LOUIS

	Base per Lb.
Plates and structural shapes	3.47c.
Bars, soft steel (rounds and flats)	3.62c.
Bars, soft steel (squares, hexagons, ovals, half ovals and half rounds)	3.77c.
Cold fin. rounds, shafting, screw stock	4.02c.
Galv. sheets (24 ga.)	4.52c.
Hot rolled sheets	3.38c.
Galv. corrugated sheets, 24 ga. and heavier*	4.57c.
Structural rivets	5.02c.

* No. 26 and lighter take special prices.

BOSTON

	Base per Lb.
Structural shapes, 3 in. and larger	3.85c.
Plates, ¼ in. and heavier	3.85c.
Bars	3.88c.
Heavy hot rolled sheets	3.71c.
Hot rolled sheets	4.21c.
Hot rolled annealed sheets	4.61c.
Galvanized sheets	4.61c.
Cold rolled sheets	4.71c.

The following quantity differentials apply: Less than 100 lb., plus $1.50 per 100 lb.; 100 to 399 lb. plus 50c.; 400 to 1999 lb. base; 2000 to 9999 lb. minus 20c.; 10,000 to 39,999 lb. minus 30c.; 40,000 lb. and over minus 40c.

BUFFALO

	Base per Lb.
Plates	3.62c.
Floor plates	5.25c.
Struc. shapes	3.40c.
Soft steel bars	3.35c.
Reinforcing bars (20,000 lb. or more)	2.05c.
Cold-fin. flats, squares, rounds, and hex.	3.65c.
Hot-rolled sheets, 3/16 x 14 in. to 48 in. wide incl., also sizes No. 8 to 30 ga.	3.35c.
Galv. sheets (24 ga.)	4.50c.
Bands and hoops	3.82c.

NEW ORLEANS

	Base per Lb.
Mild steel bars	4.20c.
Reinforcing bars	3.24c.
Structural shapes	4.10c.
Plates	4.10c.
Hot-rolled sheets, No. 10	4.35c.
Steel bands	4.75c.
Cold-finished steel bars	5.10c.
Structural rivets	4.85c.
Boiler rivets	4.85c.
Common wire nails, base per keg	3.55
Bolts and nuts, per cent off list	60

REFRACTORIES PRICES

Fire Clay Brick

	Per 1000 f.o.b. Works
Super-duty brick, at St. Louis	$60.80
First quality Pennsylvania, Maryland, Kentucky, Missouri and Illinois	47.50
First quality, New Jersey	52.50
Second quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	42.75
Second quality, New Jersey	49.00
No. 1 Ohio	39.90
Ground fire clay, per ton	7.10

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$47.50
Chicago District	55.10
Birmingham	47.50
Silica cement per net ton (Eastern)	8.55

Chrome Brick

	Net per Ton
Standard f.o.b. Baltimore, Plymouth Meeting and Chester	$47.00
Chemically bonded f.o.b. Baltimore, Plymouth Meeting and Chester, Pa.	47.00

Magnesite Brick

	Net per Ton
Standard f.o.b. Baltimore and Chester	$67.00
Chemically bonded, f.o.b. Baltimore	57.00

Grain Magnesite

	Net per Ton
Imported, f.o.b. Baltimore and Chester, Pa. (in sacks)	$45.00
Domestic, f.o.b. Baltimore and Chester in sacks	40.00
Domestic, f.o.b. Chewelah, Wash. (in bulk)	22.00

PHILADELPHIA

	Base per Lb.
*Plates, ¼-in. and heavier	3.40c.
*Structural shapes	3.40c.
*Soft steel bars, small shapes, iron bars (except bands)	3.60c.
‡Reinforc. steel bars, square and deformed	2.61c.
Cold-finished steel bars	4.06c.
*Steel hoops	4.10c.
*Steel bands, No. 12 and 3/16 in. incl.	3.60c.
*Spring steel	4.75c.
†Hot-rolled anneal. sheets	3.40c.
†Galvanized sheets (No. 24)	4.28c.
*Diam. pat. floor plates, ¼ in.	5.00c.

These prices are for delivery in Philadelphia trucking area.
*For quantities between 400 and 1999 lb.
†For 10 bundles or over.
‡For one to five tons.

BIRMINGHAM

	Base per Lb.
Bars and bar shapes	3.50c.
Structural shapes and plates	3.55c.
Hot rolled sheets No. 10 ga.	3.35c.
Galvanized sheets No. 24 ga.	4.75c.
Strip	3.60c. or more
Reinforcing bars	3.50c.
Floor plates	5.88
Cold finished bars	4.43
Machine and carriage bolts	.50 & 10 off list
Rivets (structural)	$4.60 base

On plates, shapes, bars, hot-rolled strip, heavy hot-rolled sheets, the base applies on 400 to 1999 lb. All prices are f.o.b. consumer plant.

PACIFIC COAST

	San Francisco	Los Angeles	Seattle
	Base per Lb.		
Plates, tanks and U. M.	3.45c.	3.80c.	3.85c.
Shapes, standard	3.45c.	3.80c.	3.95c.
Soft steel bars	3.50c.	3.80c.	3.90c.
Reinforcing bars, f.o.b. cars dock Pacific ports	2.275c.	open.	2.975c.
Hot-rolled sheets (No. 10)	3.45c.	4.00c.	3.70c.
Galv. sheets (No. 24 and lighter)	5.15c.	4.75c.	5.00c.
Galv. sheets (No. 22 and heavier)	5.40c.	4.75c.	5.00c.
Cold-finished steel			
Rounds	6.55c.	6.60c.	7.10c.
Squares and hexagons	7.80c.	7.85c.	7.10c.
Flats	8.30c.	8.35c.	8.10c.
Common wire nails—base per keg less carload	$3.00	$3.05	$3.00

All items subject to differentials for quantity.

ST. PAUL

	Base per Lb.
Mild steel bars, rounds	4.10c.
Structural shapes	4.00c.
Plates	4.00c.
Cold-finished bars	4.83c.
Hot-rolled annealed sheets, No. 24	4.75c
Galvanized sheets, No. 24	5.00c.

On mild steel bars, shapes and plates the base applies on 400 to 14,999 lb. On hot-rolled sheets, galvanized sheets and cold-rolled sheets base applies on 15,000 lb. and over. Base on cold-finished bars is 1000 lb. and over of a size.

DETROIT

	Base per Lb.
Soft steel bars	3.33c.
Structural shapes	3.65c.
Plates	3.60c.
Floor plates	5.27c.
Hot-rolled sheets, 8 to 30 gages above 12 in. and 3/16 in., 24 in. to 48 in. wide	3.43c.
Cold-rolled sheets	4.50c.
*Galvanized sheets	4.59c.
Hot-rolled strip, under No. 12	3.68c.
Hot-rolled strip, No. 12 and over	3.43c.
Cold-finished bars	3.80c.
Cold-rolled strip	3.55c.
Hot-rolled alloy steel (SAE 3100 Series)	5.97c.
Cold-rolled alloy (SAE 2300)	8.45c.

Quantity extras apply to all items.
*Price applies only in metropolitan Detroit.

FABRICATED STEEL

NORTH ATLANTIC STATES

AWARDS

2410 Tons, Jersey City, hospital building C, Medical Center, to Bethlehem Steel Co., Bethlehem, Pa.

800 Tons, Baltimore, rolling and grinding building for Rustless Iron & Steel Co., to Bethlehem Steel Co., Bethlehem, Pa.

600 Tons, Philadelphia, extension to plant of Midvale Co., to Bethlehem Steel Co., Bethlehem, Pa.

545 Tons, Wilmington, Del., Continental American Life Insurance building, to Belmont Iron Works, Philadelphia.

485 Tons, Pittsburgh, Water Street Improvement, contract No. 5, to American Bridge Co., Pittsburgh.

370 Tons, Erie and Niagara Counties, N. Y., State highway bridge, to Lackawanna Steel Construction Co., Buffalo.

250 Tons, Wilmington, Del., Bond Mfg. Co. warehouse, to Belmont Iron Works, Philadelphia.

160 Tons, Harrisburg, building for H. L. Green Co., to Bethlehem Steel Co., Bethlehem, Pa.

150 Tons, Dannemora, N. Y., addition, power plant, to Belmont Iron Works.

150 Tons, Chester, Pa., alterations to Chester Station for Philadelphia Electric Co., to Belmont Iron Works.

130 Tons, Enfield, N. H., Shaker Road bridge, to American Bridge Co., Pittsburgh.

120 Tons, Onondaga-Madison Counties, N. Y., State highway bridge, to American Bridge Co., Pittsburgh.

120 Tons, Allegany County, N. Y., State highway bridge, to Genesee Bridge Co., Rochester, N. Y.

120 Tons, Butler, Pa., warehouse for Phillips Gas & Oil Co., to Pittsburgh Bridge & Iron Co., Pittsburgh, through Austin Co., Cleveland.

100 Tons, Armstrong County, Pa., State highway bridge, to Carnegie-Illinois Steel Co., Pittsburgh.

THE SOUTH

1035 Tons, Avondale, La., bridge, to Jones & Laughlin Steel Corp., Pittsburgh.

840 Tons, Jefferson County, Ky., bridge, to American Bridge Co., Pittsburgh.

625 Tons, Raleigh, N. C., Hudson-Belk store, to Dietrich Brothers, Baltimore.

210 Tons, Mineral County, W. Va., bridge, to Fort Pitt Bridge Works Co., Pittsburgh.

200 Tons, Pearl River County, Miss., bridge, to Nashville Bridge Co., Nashville, Tenn.

175 Tons, Chattanooga, Tenn., housing project, to Decatur Iron & Steel Co., Decatur, Ala.

150 Tons, Nashville, Tenn., Commerce Bank, to Nashville Bridge Co., Nashville.

105 Tons, Cleveland County, N. C., bridge, to Virginia Bridge Co., Roanoke, Va.

CENTRAL STATES

1000 Tons, Grand Blanc, Mich., grade separation bridge, to American Bridge Co., Pittsburgh.

640 Tons, Steubenville, Ohio, Toronto power plant for Ohio Edison Co., to Ingalls Iron Works Co., Birmingham.

550 Tons, Dayton, Ohio, dynamometer building for Government, to Bethlehem Steel Co., Bethlehem, Pa.

320 Tons, Cleveland, Glenville high school, to Ingalls Iron Works Co., Birmingham, through Hadlock-Krill Co., Cleveland, general contractor.

300 Tons, Ravenna, Neb., State bridge 276-B, to Bethlehem Steel Co., Bethlehem, Pa.

250 Tons, Martins Ferry, Ohio, warehouse for Wheeling Steel Corp., to Bethlehem Steel Co., Bethlehem, Pa.

250 Tons, Columbus, Ohio, State bridge, to Bethlehem Steel Co., Bethlehem, Pa., through B. F. Patterson, Columbus.

115 Tons, Cleveland, Kinsman stores in Shaker Heights, to Mooney Iron Works, Cleveland.

WESTERN STATES

1728 Tons, Pollock, Cal., Salt Creek bridge to American Bridge Co., Pittsburgh.

400 Tons, Los Altos, Cal., cottrell house and precipitator at Permanente cement plant, to Moore Dry Dock Co., Oakland, Cal.

300 Tons, Mare Island, Cal., freight shed, to Bethlehem Steel Co., San Francisco.

303 Tons, Fort Peck, Mont., reconstruction of intake tunnel, to Bethlehem Steel Co., Bethlehem, Pa.

104 Tons, Parker, Colo., highway bridge, to Midwest Steel & Iron Co., Denver; also 45 tons of sheet piling to J. B. Klein Iron & Foundry Co., Oklahoma City.

105 Tons, Leadville, Colo., highway span, to American Bridge Co., Pittsburgh.

Unstated Tonnage, Grand Coulee Dam, two 350-ton traveling cranes, to Whiting Corp., Harvey, Ill.

PENDING STRUCTURAL PROJECTS

NORTH ATLANTIC STATES

3000 Tons, New York, apartment building for 240 Central Park South, Inc.

1700 Tons, Brooklyn, extension to shipways at navy yard.

1400 Tons, Providence, R. I., viaduct and approaches.

1300 Tons, Washington, extension to Buzzard Point plant, for Potomac Electric Co.

450 Tons, Fort Totten, N. Y., garage and shop buildings for War Department.

388 Tons, Columbus County, N. Y., including 77 tons reinforcing steel, highway project F.A.G.H. 8532; A. S. Wikstrom, Bound Brook, N. J., low bidder.

225 Tons, Bendix, N. J., foundry building for Bendix Aviation Corp.

215 Tons, Newport, R. I., extension to automatic machine shop for Naval Torpedo Station.

182 Tons, Dutchess County, N. Y., including 20 tons reinforcing steel, highway project S.S. 39-13; John Arborio, Inc., Poughkeepsie, N. Y., low bidder.

175 Tons, New Kensington, Pa., extension to research laboratory, Aluminum Co. of America.

150 Tons, Lawrence, Mass., Merrimac River bridge.

140 Tons, Fitchburg, Mass., convent building for St. Bernards Convent

133 Tons, Dutchess County, N. Y., bridge, highway project S.S. 39-12; Frank T. Wescott, North Attleboro, Mass., low bidder.

115 Tons, Norwich, Conn., power plant addition.

100 Tons, Haverhill, Mass., State bridge.

FABRICATED PLATES

CENTRAL STATES

2000 Tons, Cleveland, extension to ramp, East approach of Main Avenue bridge.

800 Tons, Omaha, Neb., five-story building, United Benefit Life Insurance Co.; bids Aug. 28.

800 Tons, Lancaster, Ohio, factory building for Anchor Hocking Glass Co.

600 Tons, Dayton, Ohio, addition, Millers Ford Station, for Dayton Power & Light Co.

560 Tons, State of South Dakota, three bridges; bids in.

550 Tons, LaCrosse, Wis., power plant, Northern States Power Co. of Wisconsin; bids Aug. 28.

300 Tons, Linn Grove, Iowa, State bridge FA-824-A.

275 Tons, Chicago, widening, 16th Street crossing.

250 Tons, Port Huron, Mich., tube mill extension and warehouse for Mueller Brass Co.

175 Tons, Cleveland, building No. 101 for Aluminum Co. of America.

175 Tons, Canton, Ohio, bus garage for City Lines, Inc.

140 Tons, Yankton, S. D., State bridge.

125 Tons, Decorah, Iowa, State bridge FAS-291.

WESTERN STATES

1425 Tons, Pollock, Cal., O'Brien Creek bridge; Bethlehem Steel Co., San Francisco, low bidder (previously reported).

400 Tons, Los Angeles, Lankersheim Boulevard bridge; bids in.

225 Tons, Hopland, Cal., Russian River bridge; bids Sept. 6.

160 Tons, Bowie Junction, Ariz., undercrossing; bids Sept. 1.

Unstated Tonnage, Mare Island, Cal., floating crane (Specification 9368); bids Sept. 27.

FABRICATED PLATES

AWARDS

670 Tons, Chicago, two barges for Dunbar & Sullivan Dredging Co., to St. Louis Shipbuilding Co., St. Louis.

250 Tons, Hiwasse Dam, N. C., radial gates, to Treadwell Construction Co., Midland, Pa.

205 Tons, Stamford, Conn., standpipe, to Chicago Bridge & Iron Co., Chicago.

160 Tons, Paulsboro, N. J., storage tank for Paterson Oil Terminals, Paterson, N. J., to Bethlehem Steel Co., Bethlehem, Pa.

105 Tons, Lapine, Ore., outlet pipes for Wickiup Dam (Specification 1250-D), to John W. Beam Co., Denver.

PENDING PROJECTS

250 Tons, Coronado, Cal., 1,000,000-gal. water tank.

SHEET PILING

AWARDS

1067 Tons, Fort Peck, Mont., reconstruction of intake tunnel to Bethlehem Steel Co., Bethlehem, Pa.

NEW PROJECTS

600 Tons, Erie, Pa., Peninsular State Park bulkhead.

REINFORCING STEEL

ATLANTIC STATES

AWARDS

1250 Tons, Pittsburgh, Terrace Village housing, to Truscon Steel Co., Youngstown, through A. J. Smith, Chicago, contractor.

824 Tons, Bedford County, Pa., section 12A, to Truscon Steel Co., through Holmes Co., Crystal Falls, Mich., contractor.

700 Tons, Newark, N. J., "Dreamland" Housing project, to Bethlehem Steel Co., Bethlehem, Pa., through Pellechia Construction Co., Newark.

500 Tons, Sayreville-Woodbridge, N. J., Raritan River bridge, route 35, section 14, to Bethlehem Steel Co., through Peter J. Connelly & Co., contractor.

475 Tons, Buffalo, Pillsbury flour mill, to Buffalo Steel Co., Buffalo.

450 Tons, Somerset County, Pa., section 9C-2-10-11A, to Bethlehem Steel Co., through Central Pennsylvania Quarry, Strip & Contracting Co.

390 Tons, Somerset County, Pa., section 8B-1, to Truscon Steel Co., through Connell & Laub, contractors.

345 Tons, Bedford County, Pa., section 14A, to Bethlehem Steel Co., through L. M. Hutchison, Mount Union, Pa., contractor.

300 Tons, Danville, Ky., State hospital, to Truscon Steel Co., through Barnes Construction Co., contractor.

150 Tons, Brooklyn, grade separation, grading and paving, Shore Parkway, MS-39-8, to Jones & Laughlin Steel Corp., Pittsburgh, through Elmhurst Contracting Co., contractor.

100 Tons, Boston, Storrow embankment concertorium to Joseph T. Ryerson & Son, Inc., Cambridge, Mass.

CENTRAL AND WESTERN STATES

300 Tons, Chicago, Brach Candy Co., addition to building E, to Ceco Steel Products Co., Chicago.

225 Tons, San Francisco, Coast Guard air station, to Harris Iron Works, Oakland, Cal.

200 Tons, Dixon, Ill., plant addition, Reynolds Wire Co., to Ceco Steel Products Co., Chicago.

170 Tons, Peoria, Ill., power house and office building, Keystone Steel & Wire Co., to Ceco Steel Products Co., Chicago.

130 Tons, Normal, Ill., library building, to Missouri Rolling Mill Corp., St. Louis.

100 Tons, New Ulm, Minn., sewage plant, to Republic Steel Corp., Cleveland, through Truscon Steel; R. W. Scott Co., contractor.

PENDING REINFORCING BAR PROJECTS

ATLANTIC STATES

3500 Tons, State of Pennsylvania, seven sections of Pennsylvania Turnpike, covering 1,700,000 square yards of paving; bids close Aug. 30.

2380 Tons, Boston, Dorchester district, Government housing project.

1000 Tons, Philadelphia, Lit Bros. warehouse.

600 Tons, Washington, municipal center, administration group; bids in, D. M. W. Contracting Co., Inc., Brooklyn, contractor.

270 Tons, Livingston County, N. Y., mostly mesh, highway project R. C. 4071; bids taken until Sept. 6.

152 Tons, Bar Harbor, Me., Arcadia National Park.

136 Tons, Dutchess County, N. Y., bridge approach, highway project S. S. 39-12, Frank T. Wescott, North Attleboro, Mass., low bidder.

127 Tons, Rensselaer County, N. Y., highway project R. C. 4072; bids close Sept. 6.

125 Tons, West Warwick, R. I., sewerage treating plant, James Munroe Co., North Attleboro, Mass., contractor.

116 Tons, Middle Branch, Ohio, storage building for Diamond Portland Cement Co.; bids Aug. 25.

100 Tons, Columbus, Kroger meat processing building; bids in.

CENTRAL AND WESTERN STATES

450 Tons, Charleston, W. Va., housing project.

250 Tons, McHenry County, Ill., bridge.

230 Tons, Santa Paula, Cal., bridge over Santa Paula Creek; bids Sept. 7.

133 Tons, Lapine, Ore., Wickiup Dam project (Invitation 30704-A); bids Sept. 4.

. . . NON-FERROUS . . .

. . . Germany a large copper buyer here and in London . . . Spot lead and copper abroad call for premiums . . . Domestic markets quiet with prices unchanged.

NEW YORK, Aug. 22—Harassed on one flank by threats of higher import duties on Mexican metal and on the other by the confusing European political outlook, sellers devoted most of the past week to appraising their position. On the other hand, the well bought positions of most buyers provided them also with an opportunity to study future prospects, with the consequence that most markets presented a rather dull appearance all week. Echoes of the rearmament activities of Europe were heard last week in the extreme pressure which spot supplies, particularly lead and copper, are being subjected to. This growing tightness in nearby supplies abroad forced Germany to turn to this country for several large lots of electrolytic copper last week after having made still larger purchases of blister in London. This buying, which may have amounted to as high as 10,000 tons, demanded prompt shipment and prices as high as 10.675c. per lb., c.i.f., were reported paid. The pressure for early delivery brought with it a premium on spot sales. Domestic sales were about 3400 tons for the week, bringing the total for the month through Saturday to 30,150 tons. Domestic producers' quotations are unchanged at 10.50c. per lb., Connecticut Valley, while some moderate tonnages changed hands in the open market at 10.37c. per lb. This morning's foreign business was done at around 10.50c. per lb., c.i.f., usual base ports, down 15 points from Monday and 5 points from a week ago.

NON-FERROUS PRICES

Cents per lb. for early delivery

	Aug. 16	Aug. 17	Aug. 18	Aug. 19	Aug. 21	Aug. 22
Copper, Electrolytic[1]	10.50	10.50	10.50	10.50	10.50	10.50
Copper, Lake	10.50	10.50	10.50	10.50	10.50	10.50
Tin, Straits, New York	48.75	48.75	48.80	....	48.70	48.65
Zinc, East St. Louis[2]	4.75	4.75	4.75	4.75	4.75	4.75
Lead, St. Louis[3]	4.90	4.90	4.90	4.90	4.90	4.90

[1] Delivered Conn. Valley. Deduct ¼c. for New York delivery. [2] Add 0.39c. for New York delivery. [3] Add 0.15c. for New York delivery.

Warehouse Prices

Cents per lb., Delivered

	New York	Cleveland
Tin, Straits pig	49.75c.	51.50c.
Copper, Lake	11.625c.	11.50c.
Copper, electro	11.50c.	11.50c.
Copper, Castings	11.00c.	11.25c.
*Copper sheets, hot-rolled	18.62c.	18.62c.
*High brass sheets	16.85c.	16.85c.
*Seamless brass tubes	19.60c.	19.60c.
*Seamless copper tubes	19.12c.	19.12c.
*Brass rods	12.19c.	12.19c.
Zinc slabs	6.15c.	6.90c.
Zinc sheets, No. 9 casks	10.75c.	12.10c.
Lead, American pig	6.05c.	5.95c.
Lead, bar	8.50c.	8.25c.
Lead, sheets, cut	8.00c.	8.00c.
Antimony, Asiatic	15.00c.	17.00c.
Alum., virgin, 99 per cent plus	21.50c.	22.50c.
Alum., No. 1 remelt., 98 to 99 per cent	19.00c.	19.50c.
Solder, ½ and ½	29.32c.	29.50c.
Babbitt metal, commercial grade	21.32c.	21.50c.

*These prices, which are also for delivery from Chicago warehouses, are quoted with the following percentages allowed off for extras: on copper sheets, 33 1/3; on brass sheets and rods, 40, and on brass and copper tubes, 25.

Old Metals

Cents per lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators. Selling prices are those charged to consumers after the metal has been prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	8.375c.	9.00c.
Copper, hvy. and wire	7.375c.	7.75c.
Copper, light and bottoms	6.50c.	6.975c.
Brass, heavy	4.50c.	5.00c.
Brass, light	3.625c.	4.375c.
Hvy. machine composition	6.50c.	7.375c.
No. 1 yel. brass turnings	4.25c.	4.75c.
No. 1 red brass or compos. turnings	6.375c.	6.875c.
Lead, heavy	4.125c.	4.50c.
Cast aluminum	6.50c.	7.75c.
Sheet aluminum	12.50c.	14.00c.
Zinc	2.25c.	3.50c.

Miscellaneous Non-Ferrous Prices

ALUMINUM, delivered: virgin, 99 per cent plus, 20c.-21c. a lb.; No. 12 remelt No. 2 standard, 19c.-19.50c. a lb. NICKEL, electrolytic, 35c.-36c. a lb. base refinery, lots of 2 tons or more. ANTIMONY, prompt, New York: Asiatic, 14c. a lb., f.o.b.; American, 12c. a lb. QUICKSILVER, $82.50 to $84.50 per flask of 76 lb. BRASS INGOTS, commercial 85-5-5-5, 10.75c. a lb.

Lead

With most lead buyers practically all covered on August needs and a week to go before the October books are opened, the market here was rather dull all week, with the exception of a buying flurry towards the close of the week by the battery and white lead makers. The week's sales were 75 per cent for August, with many consumers advancing September delivery dates to August. The London market was strong all week with the heavy spot demands building up a premium for nearby dates. The strong position of the market was further accentuated by announcement that domestic refined lead stocks at the end of July were 5619 tons below the 129,636-ton total at the end of June, while shipments gained 3926 tons to 42,636, the highest since October, 1938. Production in July was down 2047 tons to 37,021 tons. Prices here are unaltered at 5.05c., New York, while this morning's London price of 3.37c. on spot is a gain of 8 points over a week ago.

Zinc

With requirements for the next few months amply covered, consumers are showing little current interest in the market. Sales in the past week were 1650 tons, practically all spot, as against 4531 tons in week previous. Consumption of spelter, however, shows no sign of slackening, the week's shipments totaling 4519 tons, as compared with 4779 tons in preceding period. Domestic quotations are firm and unchanged at 5.14c. per lb., New York.

Tin

On Wednesday and Thursday last week the market experienced one of its periodic buying movements and a fair amount of tin, mostly for September and October, was traded, with tin plate makers the principal buyers. The rest of the week was a very dull affair. The buying is felt to have been due in part to underestimating requirements and in part to desire to have physical tin in hand rather than in the form of future cotracts, particularly in view of the foreign situation. Prices changed little all week. Sales abroad were light with the buffer pool holding cash standards at £229 17s. 6d. all week.

PLANT EXPANSION AND EQUIPMENT BUYING

NORTH ATLANTIC

National Lead Co., 111 Broadway, New York, has filed plans for extensions and improvements in two-story plant at 161-69 Marshall Street, Brooklyn. Cost about $50,000 with equipment. William Higginson & Son, 101 Park Avenue, New York, are architects.

David Smith Steel Co., Inc., 4601 Second Avenue, Brooklyn, manufacturer of steel and iron products, has leased one-story industrial building, 100 x 100 ft., at 236-46 Forty-sixth Street, and will improve and equip for new fabricating plant.

Commanding Officer, Ordnance Department, Watervliet Arsenal, Watervliet, N. Y., asks bids until Aug. 29 for quantity of alloy steel tube forgings (Circular 33); until Aug. 31 for quantity of alloy steel breech ring forgings (Circular 60).

Board of Transportation, City of New York, 250 Hudson Street, asks bids until Aug. 29 for drainage equipment for Line B in Sixth Avenue, from West Fourth to West Fifty-third Street, including vertical and horizontal motor-driven centrifugal pumps, air-operated sewage ejectors, automatic electric water heaters, tanks, piping, valves, automatic control apparatus and complete auxiliary equipment.

Hecker Products Corp., 88 Lexington Avenue, New York, manufacturer of polishes, etc., has let general contract to Carl M. Geupel Construction Co., Hume-Mansur Building, Indianapolis, for three-story and basement addition, 100 x 128 ft., to plant at 1437 West Morris Street, Indianapolis. Cost about $100,000 with equipment. Lockwood, Greene Engineers, Inc., 30 Rockefeller Plaza, New York, is engineer.

Signal Corps Procurement District, Army Base, Fifty-eighth Street and First Avenue, Brooklyn, asks bids until Aug. 28 for quantity of connectors and fittings (Circular 52), quantity of collector housings with mounting flange (Circular 46); until Aug. 30 for quantity of subterranean and composite cable (Circular 37); until Sept. 5 for quantity of terminal mountings, capacitors, resistors, sockets, switches, wrenches, lever assemblies for control boxes, bearings for levers of control boxes, control shafts, indicator plates (Circular 17).

Consolidated Edison Co., 4 Irving Place, New York, has taken out permit for expansion and improvements in steam-electric generating plant at East River, East 39th to 40th Streets. A new 450-ft. steel stack will be built. Plant capacity will be increased with installation of turbine-generators, high-pressure boilers and auxiliary equipment. Cost close to $1,000,000.

Saratoga Vichy Springs Co., Hamilton Street, Saratoga Springs, N. Y., has let general contract to James W. Hennessey & Son, 126 White Street, for one-story mechanical-bottling plant. Cost close to $50,000 with equipment. Melvin L. and Harry A. King, Denison Building, Syracuse, N. Y., are architects.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Sept. 1 for quantity of steel valves (Schedule 6988), quantity of drain collector gages and spare parts for boiler water and fuel oil heater service (Schedule 6990) for Brooklyn and Philadelphia navy yards.

Pyrene Mfg. Co., Inc., 560 Belmont Avenue, Newark, N. J., plans one-story addition. Cost reported close to $50,000 with equipment.

Commanding Officer, Ordnance Department, Picatinny Arsenal, near Dover, N. J., asks bids until Aug. 28 for 82,000 fuse seat liner assemblies (seamless steel tubing fabrication) (Circular 101); until Aug. 29 for one automatic six-spindle machine, 1⅝-in. capacity (Circular 181), progressive die for stamping, piercing and blanking (Circular 175); until Aug. 30 for fin (steel) assemblies for demolition bombs, riveted or spot-welded steel construction, as follows: 9299 assemblies for 300-lb. bombs, 23,000 for 500-lb., 10,323 for 1000-lb., and 3025 for 2000-lb. bombs (Circular 118); until Sept. 1 quantity of metal parts for unit boosters (Circular 128), large quantities of metal fuse parts (Circular 122).

Commanding Officer, Frankford Arsenal, Philadelphia, asks bids until Sept. 12 for extensions and improvements in local boiler plant, including new oil-fired boiler unit with capacity of 60,000 lbs. of steam per hr., complete with oil burner unit, fuel oil storage tanks and accessory equipment (Circular 132).

Commanding Officer, Naval Aircraft Factory, Philadelphia, has appropriation of $2,000,000 for expansion and improvements, including new buildings and installation of tools and equipment for increased capacity. Bids scheduled to be asked soon for different features of work.

Quartermaster Depot, 21st and Johnston Streets, Philadelphia, asks bids until Aug. 28 for gate valves, tees, sleeves, watthour meters and other equipment (Circular 669-32).

BUFFALO DISTRICT

Martin & Schwartz, Inc., 2933 Main Street, Buffalo, manufacturer of gasoline pumps and parts, is completing erection of one-story building on Mill Street, Salisbury, Md., and will occupy for new plant. Present works will be removed to new location, where production will be concentrated in future. Facilities will be provided for average output of 700 pumping units per month.

Eastman Kodak Co., Kodak Park, Rochester, N. Y., will take bids soon on general contract for new three-story and basement branch plant, 100 x 175 ft., on Prairie Avenue, near 17th Street, Chicago. Cost close to $500,000 with equipment. Schmidt, Garden & Erikson, 104 South Michigan Avenue, Chicago, are architects.

WASHINGTON DIST.

Quartermaster Depot, War Department, Washington, asks bids until Aug. 30 for about 18,000 single steel lockers for clothes, various deliveries (Circular 950-30).

Crown Cork & Seal Co., Eastern Avenue and Kresson Street, Baltimore, has asked bids on general contract for one-story addition to local Highlandtown plant. Cost reported close to $50,000 with equipment. Lucius R. White, Jr., 10 West Chase Street, is architect.

Chief, Bureau of Ordnance, Navy Department, Washington, asks bids until Sept. 8 for quantity of 1.1-in. gun barrel forgings.

General Purchasing Officer, Panama Canal, Washington, asks bids until Aug. 28 for one automatic, hydro-pneumatic type, motor-driven pumping unit, with 82-gal. storage tank; two pneumatic wrenches (Schedule 3554); until Aug. 29 for quantity of brass pipe, brass or bronze pipe fittings, and brass or bronze unions (Schedule 3559), one motor-driven air compressor, direct-connected, complete with couplings, sub-base, intercooler, regulator, fittings, etc.; also for 50 light manhole frames and covers (Schedule 3555).

Harry C. Weiskittel Co., Inc., 4901 Philadelphia Road, Baltimore, manufacturer of stoves, parts, etc., has let general contract to E. Eyring & Sons Co., 808 South Conkling Street, for one-story foundry addition, 100 x 180 ft. Cost over $60,000 with equipment. John F. Eyring, 810 South Conkling Street, is architect.

Public Works Officer, Norfolk Navy Yard, Portsmouth, Va., asks bids until Sept. 7 for one-story storehouse (Specifications 9321).

Chemical Warfare Service, Edgewood Arsenal, Edgewood, Md., asks bids until Aug. 30 for 10,000 electric detonators (Circular 52); until Sept. 7 for 18,500 copper outlet valve guards (Circular 51).

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Aug. 29 for four main propelling marine diesel engines with auxiliary machinery and spare parts (Schedule 6956), quantity of fuel injection pumps for diesel engines, and spare parts (Schedule 6984) for Norfolk navy yard, Portsmouth, Va.; quantity of electric-hydraulic type steering gears, with spare parts, tools and wrenches (Schedule 6937), one motor-driven centrifugal pump with control equipment (Schedule 6946) for Eastern and Western navy yards.

NEW ENGLAND

Commanding Officer, Ordnance Department, Watertown Arsenal, Watertown, Mass., asks bids until Aug. 31 for one 20-ft. vertical boring mill (Circular 33).

C. R. Gibson & Co., 118 East 16th Street, New York, lithographers and printers, will ask bids soon on general contract for new plant on Knight Street, Norwalk, Conn. Cost about $75,000 with equipment. Leo F. Caproni, 1221 Chapel Street, New Haven, Conn., is architect and engineer.

Fisk Rubber Corp., Chicopee Falls, Mass., is arranging fund of about $1,200,000 for expansion during next 18 months, a considerable part of appropriation to be used for purchase of new equipment for local mill.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Sept. 1 for quantity of reducing valves and spare parts (Schedule 6975) for Boston, Charleston and Puget Sound navy yards.

Commanding Officer, Ordnance Department, Springfield Armory, Springfield, Mass., asks bids until Sept. 1 for quantity of parts for revolvers, including barrels, frames, stocks, stock pins, swivels and assembly hammers (Circular 22).

SOUTH ATLANTIC

Coca-Cola Bottling Co., Inc., 560 Edgewood Avenue, N. E., Atlanta, Ga., will take bids soon on general contract for two-story and basement mechanical-bottling plant, 60 x 90 ft. Cost over $50,000 with equipment. George H. Bond, Candler Building, is architect.

Georgia Growers' Distilling Co., Albany, Ga., has let general contract to M. L. Spratlin, Atlanta, Ga., for new one and two-story distilling plant on local site, 144 x 205 ft., with smaller shop unit adjoining. Cost close to $80,000 with equipment. A. Thomas Bradbury, William-Oliver Building, is architect.

SOUTH CENTRAL

Buckeye Cotton Oil Co., Floyd and K Streets, Louisville, has work under way on expansion and improvements for increased capacity in soy bean division, to include new storage bins, mechanical-handling and other equipment. Cost close to $400,000. Company also is considering one-story addition, to be equipped as a solvent-manufacturing department. Cost about $250,000 with equipment. Company is a subsidiary of Procter & Gamble Co., Gwynne Building, Cincinnati.

District Quartermaster, District D, CCC, Fort McClelland, Ala., asks bids until Aug. 29 for eight steel tanks and towers (Circular 5405-10).

Tri-States Refineries, Inc., Spottsville, Ky., plans expansion and improvements, including new production units with capacity for handling about 500-bbl. of crude oil per day. Also steel tank storage extensions and other operating facilities. Cost over $75,000 with equipment.

United States Engineer Office, Vicksburg, Miss., asks bids until Aug. 28 for quantity of marline-covered wire rope (Circular 30), 6000 lin. ft. of plow steel wire rope (Circular 32), four portable self-priming drainage pumps (Circular 44).

SOUTHWEST

Superior Wall Paper Co., Joliet, Ill., has leased one-story industrial building, 66 x 250 ft., to be erected by Kansas City Development Co., Railway Exchange Building, Kansas City, Mo., at 16th and Howell Streets, North Kansas City, and will equip for new mill. Cost about $75,000 with machinery. General erection contract has been let to Morris Hoffman Construction Co., Victor Building, Kansas City. Frohwerk & Bloomgarten, Bonfils Building, Kansas City, is architect.

Shell Oil Co., Inc., Shell Building, St. Louis, plans new natural gas plant in vicinity of Midland, Tex., with capacity for handling 30,000,000 cu. ft. of natural gas per day, compressor plant, pumping station, steel tank storage and distributing facilities. Cost over $1,000,000 with equipment.

United States Engineer Office, Little Rock, Ark., asks bids until Aug. 29 for one hydraulic compression testing machine, not less than 300,000 lbs. capacity, with adjustable head, packless plunger and two one-dial gage indicators, electrically-operated with rate meter; also for 18 steel cylinder molds, one capping device for concrete cylinders and one concrete-mixing machine (Circular 14).

Board of Directors, Water and Electric Department, McPherson, Kan., asks bids until Aug. 30 for one 5000-kw. turbo-generator unit and accessories, and one 7500-sq. ft. surface condenser for installation in municipal power station. Cost estimated about $163,500. Burns & McDonnell Engineering Co., 107 West Linwood Boulevard, Kansas City, Mo., is consulting engineer.

WESTERN PA. DIST.

Airplane & Marine Direction Finder Corp., Lindenhurt, N. Y., manufacturer of aircraft and other precision instruments and parts, has taken over property at Clearfield, Pa., for new plant, and will remove present works to that location at early date, increasing capacity. Facilities will be provided for about 85 operatives.

OHIO AND INDIANA

Falls Steel Tube Co., Newton Falls, Ohio, manufacturer of steel tubing and kindred products, has let general contract to Ira Hawley, Newton Falls, for one-story addition, 40 x 160 ft. Cost close to $50,000 with equipment.

Board of Directors, St. Joseph's Riverside Hospital, Warren, Ohio, asks bids until Aug. 31 for new power house at institution, 63 x 78 ft., including 150-hp. boiler units and accessories, vacuum and feed water pumps, conveyors and auxiliary equipment. Leich & O'Brien, Union Savings & Trust Building, are architects.

Mercury Clutch Corp., Massillon, Ohio, recently organized, has leased one-story industrial building, formerly used by Reynolds Machine Co., and will remodel and equip for new plant for production of centrifugal-type clutches and kindred mechanical specialties. W. R. Harrison is president of new company, and L. A. Wald, Cleveland, secretary and treasurer.

Cleveland Pneumatic Tool Co., 3734 East Seventy-eighth Street, Cleveland, manufacturer of hammers, riveters, drills, etc., will take bids soon on general contract for two-story addition, 52 x 60 ft., for new mechanical laboratory. Cost about $45,000 with equipment. Ernest McGeorge, 7400 Quincy Avenue, is consulting engineer.

Contracting Officer, Materiel Division, Air Corps, Wright Field, Dayton, Ohio, asks bids until Aug. 28 for one turret punch, utility lever shear, electric grinder and one arbor press (Circular 110), quantity of aircraft speed-indicator assemblies (Circular 99), quantity of counterbores, steel countersinks, dies, chucking reamers, hand reamers, pipe reamers, taper reamers, pipe taps, hand taps, tap wrenches, etc. (Circular 112), three landing gear operating motor assemblies and six dynamotor assemblies (Circular 111); until Aug. 29 for quantity of hydraulic cylinder cups (Circular 117), quantity of twist drills (Circular 113), quantity of cap chisels, cold chisels and star drills (Circular 122), quantity of cams, collars, screws, plugs, nozzles, nuts, sleeves, washers, etc. (Circular 115).

MICHIGAN DISTRICT

American Metal Products Co., 5959 Linsdale Avenue, Detroit, manufacturer of welded steel tubing, has let general contract to Bryant & Detwiler Co., Penobscot Building, for one-story addition. Cost close to $40,000 with equipment. Giffels & Vallet, Inc., and L. Rossetti, Marquette Building, are architects and engineers.

Diesel Products Co., Muskegon, Mich., care of Floyd Davis, Muskegon, recently organized by Mr. Davis and associates, is arranging for early establishment of new local plant for production of a fuel injection pump for diesel engine service, with facilities for parts production and assembling. James I. Kibbe, Muskegon, consulting engineer, is interested in project.

MIDDLE WEST

George D. Roper Corp., Blackhawk Park Avenue, Rockford, Ill., manufacturer of stoves, ranges, parts, etc., has let general contract to Gustav W. Larson, 312 North Chicago Avenue, for one-story addition, 70 x 72 ft., for expansion in enameling division. Cost close to $40,000 with equipment. Bradley & Bradley, Brown Building, are architects.

Quartermaster Depot, 1819 West Pershing Road, Chicago, asks bids until Aug. 28 for two gasoline pumping units and accessories (Circular 199-35).

Link Belt Speeder Corp., Cedar Rapids, Iowa, recently organized subsidiary of Link Belt Co., Chicago, has approved plans for one-story addition to local plant to increase floor space about 25 per cent. It will be used for manufacture of tractors and road equipment, including parts production and assembling. Cost over $50,000 with machinery.

Coca-Cola Bottling Co., 715 Fifth Avenue, S. E., Cedar Rapids, Iowa, plans one-story addition to mechanical-bottling plant. Cost about $50,000 with equipment.

Marathon Paper Mills, Inc., Menasha, Wis., manufacturer of waxed and other processed paper stocks, has let general contract to Worden-Allen Co., West Capitol Street, Milwaukee, for two-story and basement addition, 110 x 220 ft. Cost close to $100,000 with equipment. Main offices of company are at Rothschild, Wis.

American Metal Products Co., 5959 Linsdale, Detroit, is building an addition to its plant. The annex is about 168 ft. x 285 ft.

City Council, Luverne, Minn., plans extensions and improvements in municipal electric power plant, including installation of a 600-kw. diesel engine-generator unit, 20,000-gal. capacity fuel oil tank and auxiliary equipment.

Salerno-Megowen Biscuit Co., 4500 West Division Street, Chicago, will ask bids soon on general contract for new three-story and basement baking plant, 235 x 330 ft., with packing and distributing facilities, at Kostner and Armitage Avenues. Cost close to $1,000,000 with traveling ovens, conveyors and other mechanical equipment.

PACIFIC COAST

Schumacher Wall Board Corp., 5721 South San Pedro Street, Los Angeles, has approved plans for initial unit of new plant on 12-acre tract of land at South Gate, near Los Angeles, consisting of a one-story structure, about 10,000 sq. ft. of floor space, and will carry out erection by day labor. Other units to be built at early date include machine shops, power house, two additional manufacturing buildings and miscellaneous structures. Cost close to $1,000,000 with equipment. Leland S. Rosener, 233 Sansome Street, San Francisco, is engineer.

General Petroleum Corp., 108 West Second Street, Los Angeles, has let general contract to Myers Brothers, 3407 San Fernando Road, for addition to bulk gasoline storage and distributing plant at Main and Clarke Streets, Bishop, Cal., including new one-story building, steel tanks with capacity of 50,000 gals., pumping equipment and other facilities. Cost over $60,000 with equipment.

Bureau of Yards and Docks, Navy Department, Washington, asks bids until Sept. 20 for boiler units and auxiliaries, forced and induced-draft fans, pumps, combustion control apparatus, incinerator, air compressors, gasoline engine-driven generator, piping and accessory equipment for installation in power house at naval air station, Alameda, Cal. (Specifications 8619).

Contracting Officer, Signal Office, 9th Corps Area, Presidio, San Francisco, asks bids until Aug. 26 for furnishing and installing one complete belt conveyor system in radio receiving station (Circular 2).

Washington Water Power Co., Spokane, Wash., has arranged fund of $1,500,000 for expansion and improvements in transmission and distributing lines, including extensions in rural electric system, power substations and switching stations, and other operating structures.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Sept. 1 for four motor-driven bilge pumps, complete with motors and controllers (Schedule 6974) for Puget Sound, Wash., navy yard; until Sept. 8 for quantity of spare parts for airplanes (Schedule 900-2751) for San Diego, Cal., naval air station.

A. S. M. E., Foremen Announce Machine Tool Programs

CLEVELAND.—The American Society of Mechanical Engineers announces the following program for its Oct. 5 meeting, to be held in Cleveland as a part of the Machine Tool Congress coincident with the Machine Tool Show.

Thursday, Oct. 5—Hotel Cleveland Ball Room, 8:00 p.m. Presiding: A. G. Christie, professor, Johns Hopkins University, president, American Society of Mechanical Engineers. Speakers will be Frank Dost, Sterling Foundry Co., Wellington, Ohio, who will discuss "Cast Iron for Machine Tool Frames," and Fred Volz, Lakeside Bridge & Steel Co., Milwaukee, whose subject will be "Welded Frames for Machine Tools."

The National Association of Foremen announces the following program for its Oct. 6 meeting, also to be held in Cleveland as a part of the Machine Tool Congress in connection with the Machine Tool Show.

Friday, Oct. 6—Public Hall, 8:00 P.M. C. R. Hook, president, American Rolling Mill Co., Middletown, Ohio, will be chairman. Capt. A. A. Nichoson, personnel director, the Texas Co., New York City, will speak on "Streamlined Supervision" and A. C. Horrocks, Goodyear Tire & Rubber Co., Akron and executive vice-president, National Association of Foremen, will speak on the same subect.

THIS WEEK'S MACHINE . . . TOOL ACTIVITIES . . .

. . . Sales generally lighter in the past week, but inquiry volume continues strong and outlook is bright . . . Government buying an important factor . . . Japanese increasing purchases.

Orders Off Slightly, But Inquiries Hold Level

CINCINNATI—New business in the machine tool market in this area was off just a trifle, the past week, as result of a small decline in foreign demand for lathes. On the other hand, however, the domestic demand was a trifle better, particularly for milling machines and grinders, but there was not sufficient improvement to offset the decline in export business. Manufacturers report there were a number of substantial foreign orders received during the past week and that several multiple units orders, particularly from the Detroit area are on the current domestic list. The trade generally is optimistic over present conditions and prospects for the future. In fact, one or two plants have such substantial order books that although they are operating practically at capacity, deliveries are becoming more extended daily. Inquiry continues to be definitely brisk and there are a number of quotations still pending.

August Sales Lower Than Those of July

CLEVELAND — Aggregate sales here this month are running lower than during the peak month of July. However, the general domestic picture continues strong, supported by government expenditures which have been numerous and are expected to be heavy during the next 60 days. In the case of one producer, domestic sales are leading foreign business this month by three to one. Among recent bookings was an order for 13 machines for an arsenal.

The Japanese, faced with the treaty uncertainty, are hastening purchases. All producers and sellers here expect an active fall, barring unforeseen circumstances such as widespread labor trouble.

Only Two Big Buyers Active at Chicago

CHICAGO—Business in this district is going along as usual, with no particular developments of interest emanating from the Rock Island Arsenal and the International Harvester Co., the two largest buyers in this territory at the present time. It is believed that tractor works of the harvester company will place some equipment this week that was inquired for some time ago. A number of important inquiries have been issued by the arsenal in recent weeks, and orders for this machinery will be coming in over the next month.

Buying Light in the East Last Week

NEW YORK—Buying in the past week was generally rather light, being limited essentially to small tools. Several purchases by the Watervliet arsenal in the past week fell into this category. For most sellers, sales thus far this month are holding up well to the July level, but a slight slackening in the past week makes it appear doubtful if the full month will show results as good as July. Aircraft buying, which has been very slow for some time, is expected to be revived after the first of September. Most of current purchases appear to be traceable to some form of government activity. Chief favorable factor in the outlook for the future is the continued substantial volume of inquiries, both domestic and foreign, coming before the trade.

Springfield Trade School Asks for Bids on Tools

BOSTON—Fred E. Barker, chairman, city property committee, Springfield, Mass., will accept bids until 5 p. m., D.S.T., Sept. 7 on the following equipment for the city's new trade school: Universal, cutter, surface, wet wheel and small tool grinders; radial, heavy duty, upright and sensitive drills; shaper, lathes, milling machines, punch presses, die filing machine and metal cutting hack and band saws; also motorized units for changing present equipment to direct drive units.

Machine Tool Sales Low at Detroit

DETROIT — Machine tool dealers in this area report that new projects and sales are at a low point as the automobile industry actually gets into production on 1940 models. Interest is centered on completing installations and tooling jobs for production. Small tool sales and the completion of duplicate dies are getting the greatest play and will continue to do so for several weeks. Tool and die manufacturers estimate that their programs for the automobile industry will be completed in approximately three weeks with shut-downs imminent thereafter unless other industries come into the market.

. . . PIPE LINES . . .

Humble Pipe Line Co., Humble Building, Houston, Tex., an interest of Humble Oil & Refining Co., same address, plans two new welded steel pipe lines in North Permian Bay district, near Fort Worth, Tex., for crude oil transmission, connecting with company pipe line system in that area. Surveys also have been authorized for new 4-in. welded steel pipe line from Tubb oil field in western part of Crane County, Tex., to connection with present main line of company, about five and one-half miles, for similar service. Work will proceed at once on another 8-in. welded steel pipe line, about 10 miles long, forming a loop for present crude oil transmission system in vicinity of Judkins, Tex.

Sahara Oil Co., Pecos, Tex., plans new 3-in. pressure pipe line from oil field in Ward County, Tex., area to connection with present main pipe line system, about 50 miles, for crude oil transmission. New line will follow route of Pecos River, forming southern boundary of Ward County and northern point of Pecos County. It is proposed to use heavy cast iron screw joint pipe.

Standish Pipe Line Co., Esperson Building, Houston, Tex., recently organized subsidiary of Phillips Petroleum Co., same address, has authorized immediate construction of new welded steel pipe line from oil field near League City, Galveston County, Tex., to bulk terminal of parent company at Pasadena, on Houston ship channel, near Houston, about 20 miles, for crude oil transmission to latter point. Main offices are at Bartlesville, Okla.

Mississippi River Commission, Vicksburg, Mass., closes bids Sept. 7 for 40 lengths of 10-in. i.d. spiral riveted, or welded steel pipe, with flanges attached both ends, each length 40 ft. (Circular 13.)

Standard Oil Co. of Ohio, Midland Building, Cleveland, has approved plans for new 10-in. welded steel pipe line from connection with recently acquired pipe line system of Tide Water Pipe Co., Ltd., at Stoy, Ill., to point near Salem, Marion County, Ill., over 100 miles, for crude oil transmission. Company also has begun work on new 6-in. welded steel pipe line from oil pool lately opened at Griffin, Ind., to Mount Vernon, Ind., about 24 miles, for similar service. Connection will be made at latter point with main pipe line system of company.

Utah Oil Refining Co., Utah Oil Building, Salt Lake City, Utah, has approved plans for new welded steel pipe line from Wamsutter, Wyo., to Craig, Colo., about 120 miles, for crude oil transmission, forming a branch of main pipe line carrier from Fort Laramie, Wyo., to Salt Lake City, on which work is being placed under way, recently noted in these columns. Company is a subsidiary of Standard Oil Co. of Indiana, Chicago

Magnolia Pipe Line Co., Magnolia Building, Dallas, Tex., a subsidiary of Magnolia Petroleum Co., same address, has let contracts to T. R. Jones, Inc., Magnolia Building, and Sheehan Pipe Line Construction Co., National Bank of Tulsa Building, Tulsa, Okla., for new welded steel pipe line from oil field at Kilgore, Gregg County, to Beaumont, Tex., about 225 miles, for butane gas transmission to oil refinery of parent company at latter point. Line will parallel an existing pipe line carrier of company for crude oil service. First noted contractor will build section of line from Kilgore to Francis, Sabine County, Tex., and Sheehan company from that point to terminus. A pipe line gathering system will be installed in Kilgore fields, connecting six casinghead plants. Booster stations will be located at Kilgore and Francis.

Reno, Nev., asks bids Sept. 20 on 4600 ft. of 14-in. pipe with cement asbestos, fusion welded steel and cast iron alternates.

State purchasing agent, Helena, Mont., has taken bids for 9500 ft. of 10-in. pipe line at Warm Springs, Mont.

Grand River Dam Authority, Vineta, Okla., asked bids Sept. 12 for removal of present pipe lines and construction of 55,150 ft. of double 10-in. lines in new location.

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JUST BETWEEN US TWO

Backpat

Out of respect for our Oberleutnant's morbid distaste for self-praise in the nude, we should clothe the following in sackcloth, but don't see how we can without ruining it, so here goes:

Our Detroit representative called the other day on a certain sizeable plant and found all our contemporaries lined up on the reception room table, but no Iron Age. He asked why, and was told, "Hell, we use that one."

Super-Stopper

Tide, the advertising journal, says Bethlehem Steel Co. has a certain ad headed, *"We like it carnal."* Your favorite family journal hasn't been blessed with it yet, and we are anxiously waiting to see how the leap from the headline to the text was negotiated.

Undollar-Marked Love

Which reminds us that Atlantic City, N. J., has a Freelove Machine Co.

Information, Please

Leon Wesley Moffett, our omniscient Washington editor and our own John Kieran, informs us offhandedly, after telephoning the Coast Guard, that a nun buoy is a conical buoy with no signal. It is usually placed between lighted buoys.

As he ducks the question about the guvment buying a rum distillation unit, we assume this is something to be kept quiet. Not that we blame them; the liquor tax burns us up, too.

Thanks, Docs

That blink test conducted by Dr. Matthew Luckiesh *(loo-keesh')* and Frank K. Moss, of G-E Nela Park, reveals that you should not permit your favorite family journal to lie prone while you read it. You should tilt it so that it will be perpendicular with your line of vision—at a 90 deg. angle. In that way you get a relative visibility of 100. Let it lie flat, as on a desk top—at a 135 deg. angle—and visibility drops to 70.

Or, put it another way, at the proper 90 deg. angle you can read 7-point type like this as easily as you can read 10-point type like this at a 135 deg. angle.

Heat Wilts Sales Patter

The heat last week caused the lady who sells lavender on the corner of W. 39th St. and Seventh Ave. to lose her suavity. When we passed her she was muttering, "Won't somebody *please* buy some of this damned lavender!"

Spirit of Motion—In Deep Tan

Never one to look a press release in the teeth, we accept at face value Graham-Paige's story about a South African native who looked at the current model and promptly assumed the posture of a runner about to start a dash.

We will even concede that a head-on view of most of this year's cars will enable native mask-makers to establish a new high in scare value in next year's masks.

Puzzles

As you saw at a glance, last week's bear was white, as the North Pole is the only place where you can walk 3 miles south and 5 miles south and still be only 3 miles from home.

One of the 18 readers of this column, who wishes his name withheld, is sore about the answer to the monkey problem. Thomas Abraham contends that if a gun is aimed at a monkey in a tree, and the monkey drops the instant the gun is fired, the monkey will be hit regardless of the bullet's velocity or the distance between gun and tree, always provided the tree is within range. Our angry reader writes.

"Why argue! If the path of the bullet is not a function of V, the velocity, then I am the monkey's uncle and the world has wasted a lot of money in unnecessary powder during battle."

Regardless of that, we'll string along with Mr. Abraham and Isaac Newton.

This one is rather vague but maybe you can make something out of it:

Mr. X, who works in the city, is in the habit of arriving at his suburban station at 6:12 P.M. His chauffeur leaves home at a time that enables him to meet Mr. X just as the train arrives, and to reach home at 6:24 P.M.

One afternoon Mr. X arrives at the station at 6 P.M. and decides to walk until he meets the car. He would have arrived home at 6:22 if the chauffeur had not been delayed by being compelled to continue on for a short distance in order to turn around. It takes the chauffeur ½ minute to arrive again at the spot where he had met Mr. X, who in the meantime continues walking. They arrive home at 6:22½ P.M. Assuming a uniform speed for the car, how much time did Mr. X spend in walking?

—A.H.D.

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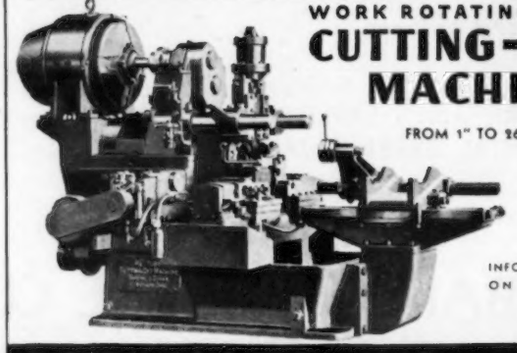

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